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NOVEMBER, 1928 **Vol. III., No. 7**

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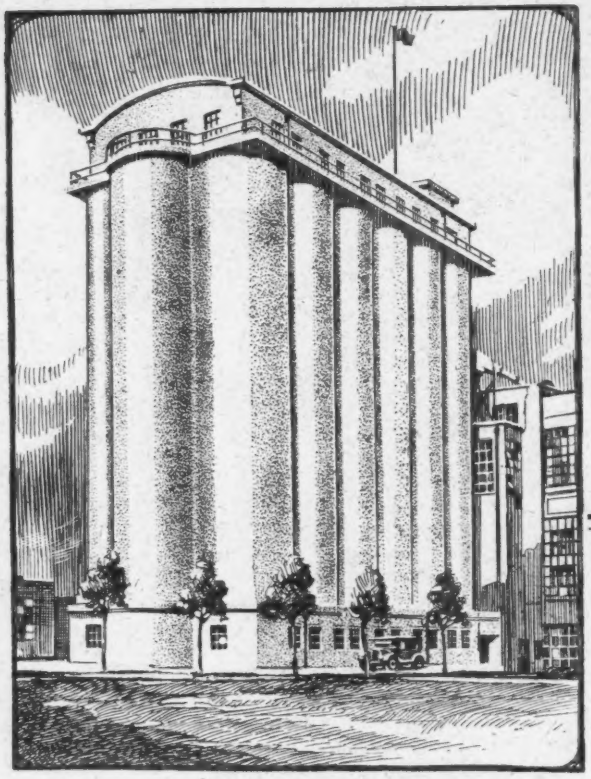

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Published every month at

THANET HOUSE, 231-2, STRAND, LONDON, W.C. 2

(Opposite the Law Courts)

Annual Prepaid Subscription, 10s. post free

Telephone: Central 8217. *Proprietors: Leonard Hill, Ltd.*

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The editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photographs or drawings whenever possible.

November, 1928

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Mayonnaise Convention.

WE NOTE that the Mayonnaise Products Manufacturers' Association of America, Inc., held its annual convention at Boston during the last week of October. There is plenty of room, especially in this country, for more open discussion on the science and manufacture of mayonnaise. The situation in America is taking an encouraging turn; readers will recollect our references to efforts which are being made in that country to straighten out the confusion existing in the nomenclature, classification, and standardisation of mayonnaise products.

Surplus Fruit Products.

The orchardists of the Okanagan Valley in British Columbia, situated as they are some 300 miles from any large city, are faced with a rather acute problem arising out of the lack of a market for their inferior apples. The transportation cost of these culls to an outside market, such as Vancouver, would be prohibitive. The only solution of the problem appears to be the manufacture of by-products from unsaleable fruit at the centres of production.

Two industries, utilising the poorer grades of apples, are believed to hold out some promise of success and are gradually being established. One of these concerns itself with the manufacture of vinegar and cider and a plant at Vernon, the first of its kind to operate in that region, consumed more than 800 tons of apples during the past year. By complying with the pure food laws of the Dominion, the plant is able to turn out a vinegar and a non-alcoholic "champagne" cider which can carry a label marked "pure," thus designating it as an unadulterated product.

The other industry concerns itself with the drying of apples, prunes, and similar fruit, one plant alone utilising some 2,000 tons of fruit during the past year. The district horticulturist has been urging the expansion of this industry, pointing out to the growers that there is an ever-increasing market for dried or evaporated apple butter, jelly, and apple sauce.

Eastern Canada, likewise, has its own peculiar food problems. Attempts are being made to find outlets for dried and canned fish. The West Coast of Africa is being closely studied for market possibilities. Since Scandinavian dried and canned fish control the market at present, their methods are being carefully examined and an attempt will be made to follow their processes of drying fish.

Views on Preservatives.

The views of the Hon. Secretary of the Sanitary Inspectors' Association, Mr. J. P. Humphery, are entitled to respectful consideration, and they follow along much the same lines as those we have taken during the past few months. We are quite safe in

assuming that the first and foremost duty of the Association is that of safeguarding the public health. In a recent statement, Mr. Humphery points out that it is becoming more and more evident that attempts are being made to coerce the Ministry of Health into modifying the Regulations. First came the suggestion that the outbreak of paratyphoid this summer was directly traceable to the absence of preservatives in dairy products. The decisive reply to that suggestion was that paratyphoid germs are not destroyed by the addition of boracic acid.

Now comes a frontal attack by the meat trade, which tries to throw on the Pure Food Act the direct responsibility for an increase in the number of food-poisoning cases. But no proof of the reasonableness of this assertion has been put forward.

It is questionable whether cases of food-poisoning have increased in either number or gravity during the current year, and such cases as have occurred have, in the opinion of the majority of public health officials, been due almost entirely to the effect of exceptionally hot weather encountered during certain summer months. During the years before the passing of the Pure Food Act there were many virulent —and frequently fatal—outbreaks of food-poisoning.

Mr. Humphery goes on to say: "It was as much to end the indiscriminate masking of food unfit for human consumption as to stop excessive use of harmful chemicals that the new regulations were expertly drawn up and passed. The result has been a better, cleaner, safer food supply, and to repeal or modify the regulations at a time when we are really beginning to feel their benefit would thrown us out of line with those excellent movements that have as their end the improvement of the nation's health."

The Package Insert.

The merits of the package insert, that "eager builder of goodwill," are discussed at some length in an American contemporary. The contention is that it is a mistake to crowd much copy on the outside of the package if you are aiming at the appearance of quality there. This appears to be sound advice. Then, again, one is urged to put "reasons why" into newspaper, magazine, and poster advertising, and, in addition, to put a few words dealing with this matter inside the package on a well-printed, carefully designed inset.

Apparently, there are eleven functions that inserts help to perform. These are given as: (1) Directions for use; (2) suggestions for wider use; (3) advertising other products; (4) the guarantee; (5) to call attention to unusual features; (6) repetition of advertising points; (7) securing the names of prospective buyers; (8) making offers of samples, booklets, etc.; (9) to get testimonials; (10) to help display the product; (11) to describe ingredients or manufacture.

Waste Food Products.

The Waste Food Products, Ltd., is very much in evidence in these days of Stock Exchange fireworks. Certainly it is one of the "rockets," and although we are not to be found amongst the lucky band of shareholders, yet we wish it all success in its upward flight and trust it will become one of the Stars of Throgmorton.

At the first general (statutory) meeting, Mr. John Lewis, the Managing Director, made public some of the aims and objects of this concern. Waste food, which forms the raw material for factory operations, is defined as including fish, meat, bone, and other waste from restaurants, hotels, kitchens, abattoirs, and markets. The company supplies sterilised bins to the various collecting centres, where they are filled with the sorted material. At the factory it is again sorted in order to remove the miscellaneous cutlery which apparently succeeds in smuggling itself through the first line of defence. This cutlery is collected and returned; this is part of the contract, although we should have thought that it would be more profitable to arrange that no part of the waste is returnable and to run a "lost property office" as a sort of side-line. After all, the cutlery is just as much a waste food product as the fats and meals, and it offers the advantage of introducing an element of speculation into the enterprise. Indeed, it might be found that the recovery of this particular by-product was the most lucrative side of the whole business.

This sorted material is charged into a disintegrator handling five tons per hour. This is a fearsome machine, as the shareholders are expressly warned against approaching it too closely. From there the material is elevated to the top of the building and goes through a drier and thence to a fat-extracting plant. The resulting fat is refined and put into barrels and the feeding meal is graded, ground, and sacked. The entire process is automatic, and six people only are required to handle eighty-two tons a day.

Food Substitutes.

Whilst on the subject of "waste products," it is interesting to recall the fact that during the war there appeared among the innumerable food substitutes on the Continent two purporting to be "meat"; these were called "Wurst" (sausage) and "Schnitzel" (cutlet). They consisted of a mixture of potatoes and yeast combined by an amorphous substance (paste) seasoned with a little pepper and coloured by a coal-tar dye. A substitute much more nearly resembling meat than these was one obtained by treating blood with chloride of lime and oxygenated water, which was called in Germany "Fleischersatz" (meat substitute) and "Sparfleisch"

(economy meat). Other substitutes were "Fleischextract" and "Knochenbrüherzeugnisse."

Lindet states that the serum of horse blood can replace white of egg, as it contains 10 per cent. of coagulated albuminoid. Food made from this serum had an excellent taste. Bleeding a horse produced 20 litres of blood yielding 10 litres of serum, equivalent to 200 eggs.

"Molkenlimonade" was much favoured in Germany. A method of treating skimmed milk consists in curdling it by pressure or with an acid and then adding sugar to the separated whey, finally passing in carbon dioxide. In this way a refreshing and palatable drink is obtained.

Straw Bread.

Friedenthal claimed to be able to make a meal from straw, hay, and other parts of plants, but the claim did not carry conviction, and so great was the incredulity expressed that the matter was dismissed. However, some scientific tests were carried out upon this subject. It is stated that oat straw meal was actually used to make bread, and that the latter contained 6 per cent. of albuminoids and 57·5 per cent. of carbohydrates and cellulose.

A Minden baker discovered a process by which bread was made with the use of bicarbonate of ammonia. A solution of this was added to a paste of potato-flour and served as a substitute for fats.

The Russian peasants make use of a plant called "Krasnaja trava" for making breadstuff flour—especially in bad seasons.

Other Breads.

A German bread that was said to be light and good was prepared with 50 parts of raw potatoes grated, 50 parts of cooked potatoes, 50 parts of grated carrot, 5 per cent. sugar, and a little salt, kneading the whole with skim milk and yeast, allowing it to rise for six hours at 30° C., then mixing 10 parts of dried skim milk and as much flour of a high extraction (Kriegsmehl) as was needed to make a sufficiently hard paste.

According to W. Ostwald and A. Riedel, it is possible, or at least it was possible during the war, to replace within certain limits for the purpose of breadmaking the gluten of cereal flour by starch paste. By using a paste of potato starch and chemical yeast they succeeded in obtaining a satisfactory potato flour bread; and bread was also made with mixtures of potato flour and tapioca.

Dairy Products.

At the present time, when the question of pure dairy products is claiming the attention which it deserves, although somewhat belated, we consider it is our duty to remind readers of Mr. Paul Arup's translation of *Dairy Bacteriology* by Dr. Orla-Jensen. Mr. Arup contributed an article to this Journal on the manufacture of margarine, a continuation of which will shortly appear.

This book is not, as might be imagined from its title, a mere catalogue of dairy germs. Although bacteriology is taken as a basis for the discussion of dairy products, the book is an essentially practical one and covers such subjects as the cleaning and procurement of milk, the sterilisation and pasteurisation of milk, milk from town supplies, the souring of cream, the changes of butter on keeping, the ripening of cheeses, and the grading of milk. It can be read with profit by the ordinary person who has little theory, but more practice.

Cheese Ripening.

In view of the series of articles on cheese by Mr. Lord, which are being published in this Journal, reference may be made to recent work carried out by M. Solari (*Anal. Ofic. Quim.*—Province of Buenos Aires Journal—1928, Vol. I., pp. 107-139).

Observations and periodical analyses have been carried out on various varieties of cheese, particular attention being given to the "Sbrinz" variety. Highly interesting figures are given regarding the stages of the so-called ripening of cheese, the observations being made over a period of eleven months. The data are tabulated and they record the fluctuation of the following constituents: ash, salt, moisture, organic acidity, fat, ammonia, amine compounds, and albuminoids. A study of the figures of the analyses shows that the compounds increased directly in proportion to the time and rate of the ripeness. A remarkable feature is the rate of progress of the acidity of the cheese, there being a decrease in acidity up to about the fifth month, at which stage the fat constituent of the cheese began to decompose; at this point the organic acids increased rapidly up to the end of the time of the investigation.

M. Solari has carried out a very thorough investigation on the subject, and has broken new ground. The discussion includes references to hitherto unknown phenomena in the complex processes which operate during the ripening of cheese, and will undoubtedly lead to further researches on the subject.

Corrosion.

A correspondent informs us of an unusual case of the corrosion of the metal parts of a milk bottling machine, which was traced to defective insulation in an electric motor. The tubes in contact with the milk became deeply pitted and coated with an incrustation of green copper salts.

Whey Disposal.

In the September issue of the Journal of the Ministry of Agriculture, Dr. E. A. Fisher, Director of the Research Association of British Flour Millers, St. Albans, has an interesting article on the utilisation of dried whey in the milling and baking industries.

Very large quantities of whey are produced annually at cheese-making centres, and since whey contains 93 per cent. of water, the question of its economic disposal is a difficult one. During recent years drying on a small factory scale has been attempted, since dried whey keeps well and possesses great nutritive value. The cost of production has been greatly reduced through the introduction of an improved roller drying plant, developed and patented by Captain J. Golding, of the National Institute for Research in Dairying, at Shinfield, Reading, and Mr. J. C. Stead, and is now being tested on a commercial scale.

The composition of the solid matter of whey is given as: Fat, 0·21; protein, 0·87; milk sugar (lactose), 4·80; ash, 0·48; undetermined solids, 0·47. Dr. Fisher gives valuable information on the utilisation of dried whey in feeding stuffs and in bread making.

Whey in Feeding Stuffs.

Whey possesses a food value over and above that supplied by the protein, fat, and carbohydrate (sugar) present, in that it increases the availability of a ration, probably owing to its mineral or ash content. The importance of the mineral constituents of feeding stuffs has been recognised in recent years, and it is now realised that the nutritive value of a feeding stuff cannot be completely expressed in terms of protein content and starch equivalent; the amount and composition of the ash is also of importance. It would appear that it is desirable to increase, generally, the mineral constituents of feeds, and, further, that in any mineral addition the constituents should be present in proper proportions. Dried whey is a particularly useful product in this connection; it is cheap, it is almost completely digestible, and, as a milk product, its mineral constituents are well balanced. It is also particularly rich in lime, the mineral constituent in which wheat and wheat offals are deficient. By adding 10 per cent. dried whey to fine middlings, the total ash content is increased by 0·76 per cent., the digestible carbohydrate by 1·8 per cent., and the starch equivalent by nearly 1 per cent.

Dried Whey in Bread.

By replacing 5 or 10 per cent. of flour with a corresponding amount of dried whey, some hundreds of very excellent loaves have been made in the Research Association's bakehouse. Such loaves contain more ash and somewhat more protein than ordinary loaves, and will keep longer without staling. The texture or pile of the loaf is good and the grain is good, but rather more open than that of ordinary loaves. The flavour is distinct and characteristic and very pleasant. The crust is good and somewhat biscuit-like in nature, and the colour of the crumb is somewhat darker and yellower than that of ordinary loaves. The doughs are considerably more sticky than ordinary flour dough, but the stability does not appear to be seriously affected. The fermentation period is lengthened, or, rather, good loaves can be made over a larger fermentation period, which is a practical advantage. As the fermentation time is increased the characteristic whey colour and flavour and stickiness are diminished.

Many baking tests have also been carried out with admixtures of 5, 10, and 15 per cent. dried whey with various wholemeals. In all cases, the whey made the doughs sticky, but no ill-effect on stability was observed. With all meals, the added whey made a distinct improvement in colour, texture, and flavour of the loaves.

Caramelised Whey.

If the powdered whey is heated for one hour at 120° C. (248° F.), the sugar is partly caramelised and the colour becomes bright brown. Some moisture is lost, and the product becomes quite hard and can be easily ground into a fine powder. This caramelised whey can also be used for bread making, but the yellowish-brown, almost ginger, colour of the resulting loaf is probably too pronounced to meet with popular favour. In any case, no advantage results from such caramelisation that would offset the extra cost of production involved. With brown bread the case is probably different; the rich brown colour resulting from the use of caramelised whey might prove attractive to lovers of wholemeal bread.

Caramelised whey can be easily ground to pass through a No. 10 or 11 flour silk. Ordinary dried whey can be ground to an equal fineness, although somewhat less easily than the caramelised whey. There is, however, no real difficulty, and the finely powdered whey can be incorporated with the flour or wholemeal to produce "whey flour" or "whey meal." This is undoubtedly the best method of utilising the whey for bread making purposes. It yields a uniform product, which can be stored satisfactorily, and the resulting loaves would be less affected by differences of treatment as between different bakers, for baking instructions could be issued with the flour.

Experiments are also being made in drying whey with admixtures of separated milk. The dried products of such mixtures are of better colour and are more easily powdered than pure whey.

Condensed Milk

By CHAS. E. SEARLE

Perhaps the most important advantage of glass-packed goods is that the purchaser can see what he is buying, and consequently the manufacturer has to give great attention to appearance. And as appearance and quality do not always go hand in hand, sometimes quality has to suffer. For many preparations the tin container holds its own; generally it is cheaper, easier to sterilise, gives fewer defective articles, and so obviates waste of time, money, and effort. It is an open question, however, whether the glass container is the best. It is scarcely suitable for such articles as pickles and sauces, but, doubtless, some improved alloy will be ultimately used for canned foods. In this article condensed milk, which is one of the most valuable food preparations on the market, will be dealt with. For this the tinned iron container can satisfactorily hold its own.

ONE IS reminded of the old recipe for Jugged Hare—first catch your hare—and in considering the question of condensed milk, one can safely begin: First catch your cow. One of the most remarkable things in our history as Englishmen is the way we have neglected opportunities and trusted to the sea to supply all our needs. Slowly we are waking up to the possibilities of the tinned fruit industry, but if asked who makes condensed milk most people would give the name of a firm which is not English. Capital can be found for dog racing, but to find the necessary capital to build up an industry of this description, which would benefit the country generally, would be a far more difficult task.

Anyone wishing to consider this important industry and unable to inspect a condensed milk factory would be well advised to go to a large bottled milk factory, where he will probably be welcomed, as this is not a secret trade. There he would see very careful methods adopted; cleanliness is supreme at each of the various processes of cleansing, straining and pasteurising, bottle cleaning, and, finally, filling and capping.

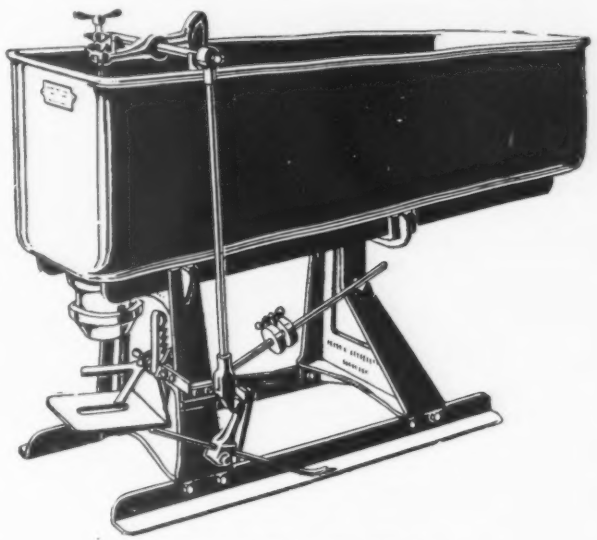
There are several varieties of condensed milk; skimmed and unskimmed, sweetened and unsweetened, but in England probably 90 per cent. of the sale is of the sweetened variety.

The milk from cows varies greatly, not only at different times of the year, but in different parts of the country, and care must be taken to standardise if a first-class, reliable article is to be produced, which is the aim of every manufacturer. Sometimes milk is inclined to be slightly acid, and the works chemist will need to keep in close touch with the process from start to finish.

The most interesting part of the process is, of course, the actual condensation of the milk; but there are other essentials to successful manufacture which also merit serious attention.

Condensing

One of the best plants for the condensation process is arranged somewhat as follows: The evaporator itself is usually built of hard, beaten, tinned copper, though for the unsweetened variety, tinned iron is sometimes used. The heating is effected by means of vertical, open-ended tubes, which are surrounded by steam, and which communicate at either end with a bottom and top pan. A vigorous circulation is thus maintained between these two parts of the apparatus. The constant incursions into the top pan enable the vapour to be quickly expelled. The liquor is kept constantly in motion, and so no local overheating takes place. The top and bottom pan are easily accessible for cleaning purposes, as are also the tubes; the water vapour is drawn off to the condenser.



Condensed Milk Filling Machine.

The milk is boiled in vacuo. A vacuum pump connected to the boiling chamber enables it to boil at a much lower temperature than would otherwise be possible. Plant with a capacity up to 1,000 gallons of milk can be obtained.

The milk is first strained through fine sieves of silk or other suitable material, or is passed through a filter press. A preliminary heating is usually given in large, open tanks. If it is not possible to use the milk immediately, it is run over coolers—pipes through which cold air or water circulates.

As stated, the vacuum plant is, of course, used to reduce the milk at a much lower temperature than ordinary boiling water, and when the vacuum gauge registers about 20 to 25 inches, the milk will evaporate at a temperature of 130° F.

Of course, to heat the milk unduly will alter its nature: this is why an open pan is not used. If the temperature shows a tendency to rise, the source of heat is immediately reduced; this, however, is purely a mechanical process, and an appliance which does this work automatically can be fixed.

When the milk is reduced to about a quarter of its original weight or volume, as estimated by the quantity of condensed liquor, it will be found to be of about the right consistency, though this depends to some extent on the quality of the milk, as milk rich in fats requires less reducing.

The Homogeniser

The sugar is melted in an open pan and about one-eighth of the weight of the milk added. The milk is drawn off the vacuum plant and passed through the homogeniser, which breaks down any particles of fat, secures a consistent article, and obviates the possibility of any cream rising to the top of the can in the further processes.

The Filling Plant

From here the milk passes to the filling plant. One of the best known types has a tank of some ten gallons capacity, which is fed from the main storage tank.

The supply to this tank is regulated by a float valve, so that the milk is always at a constant head above the valve seating.

Inside the tank is a plunger, valve, and guide, and these lift away, leaving the tank perfectly clear for cleaning purposes.

The plant has a system of heating by which the milk is kept in a more or less liquid condition and is allowed to flow freely.

Thirty eight-ounce tins can be filled in one minute, or with more heads the output is naturally increased. The tins come down a conveyor on to a scale, adjusted to the required weights. The starting handle is then struck down; this lifts the valves and starts to fill the tins, and when the correct weight is obtained the scale descends, and the valve automatically cuts off the supply with such accuracy that the apparatus complies with the Board of Trade weights and measures regulations.

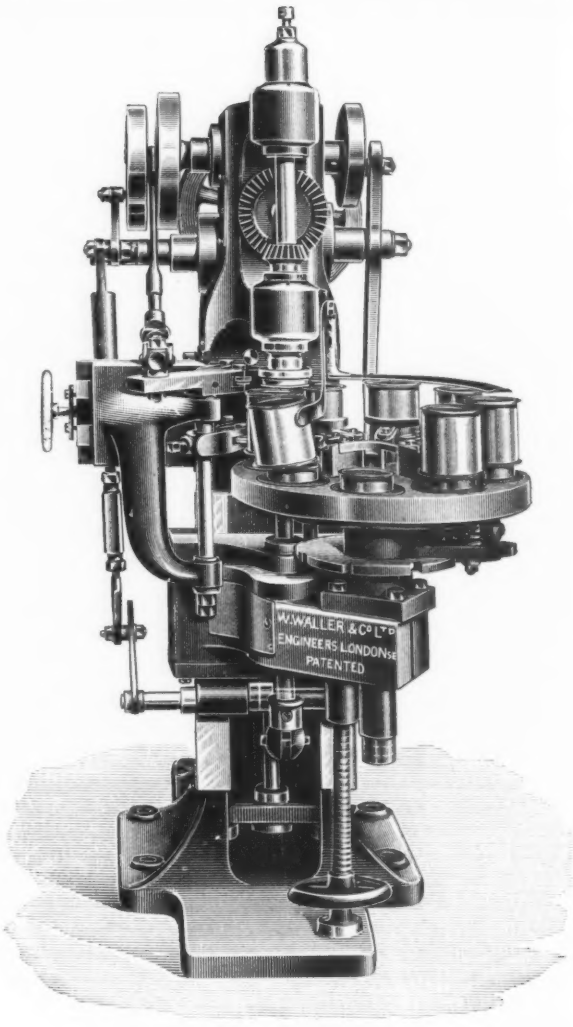
Sterilisation

The tin then passes to the machine which wheels on the caps securely, and after samples have been taken, the batch is placed in the steam retort for sterilisation. The retort, or autoclave, is fitted in the usual way with inlet and outlet valves, thermometers, and pressure gauges.

This retort is constructed somewhat differently from the retorts usually used for sterilising, in that it has a cage inside which is kept constantly rotating, so that there is little chance of the milk separating during this part of the process.

To the retort is fixed a recording thermometer, of which there are various makes.

The temperature of the retort varies in different factories, but giving due regard to safety, it is



Double Seaming Machine.

desirable to treat the tins at as low a temperature as practicable, and to keep them in the retort for the shortest time possible. Generally speaking, if the temperature rises to 240° F. for some twenty minutes all bacteria will be killed, and the contents will keep in a perfectly sound condition for an indefinite period.

Cooling

The retort is then opened, and the tins are removed and passed under a spray of water to cool them. The ends will then become concave, showing that the tin is sound; if this does not take place on cooling, some defect may be looked for.

Testing

Samples are taken and placed in testing cupboards, where they are kept at a temperature of 90° to 100° F. for about ten days; if after this they are found to be sound and in good condition, the batch is ready for the market. After passing the cleaning, labelling, and boxing machines, it is ready for despatch to any part of the world.

Some Further Consideration of the Ripening Period in Cheese

By L. J. LORD

Below is the third part of a valuable series of articles dealing with the general principles underlying the practice of cheesemaking. Last month the author discussed the various components of cheese, and traced out the general course of ripening and, also, the factors involved. The present article deals with the more practical aspects of the ripening process in detail.

PART III

IT MAY be easily realised that a cheese practically perfect in composition and condition when it comes out of the press, may soon become irretrievably damaged and ruined as a first-class article if it is not stored under suitable conditions and properly cared for thereafter.

In some cases the cheese manufacturer attends to this part of the whole procedure and makes no attempt to sell the cheese until it is quite ready for consumption. In other cases, the maker disposes of the cheese as soon as it will travel, and although a lower price is obtained, this ensures a quicker turnover of capital and avoids a certain amount of risk. The cheese buyer or factor may find it to his advantage to ripen the cheese before reselling, in which case he needs to be provided with suitable premises; but his decision may depend very much upon the variety of cheese being dealt with, and generally the cheese dealer is no more than a distributing agent between maker and retailer—that is to say, the transfer is made without any unnecessary delay. This method of procedure is very general in districts where much comparatively new, or unripe, cheese is consumed.

Surface Drying

The first essential to the proper care of cheese in store during the early stages is to see that there is a supply of fresh air circulating in the room. This is necessary for the purpose of drying the surface of the cheese so that a coat or rind will form satisfactorily. At the same time, the cheese requires "turning," the dairymaid reversing the top and bottom surfaces by turning the cheese "upside down" on the shelf. This turning must be done every day for a week or so, and thereafter at less frequent intervals, according to the size and needs of the cheese. A moist kind of cheese, or a "tall" one, requires turning more often and perhaps for a longer period of time than one of a firmer, more solid, variety, or one of "flat" shape. The moist cheese may require a clean, dry shelf each day so that the old position must be washed and have time to dry before the following day. The "tall" cheese will lose shape if allowed to stand too long without turning while in the new state.

Once the preliminary surface drying is assured, anything in the nature of a definite current of air is quite out of place, as it will reduce the weight of the cheese and eventually cause the rind to crack.

Natural Moisture

Moreover, this natural moisture in the cheese—that is, the amount incorporated in the process of manufacture by proper and legitimate means—is requisite to the proper ripening. By giving full consideration to the conditions that suit the requirements of a particular kind of cheese, or cheese market, the loss of moisture in the process of curing may be reduced by nearly 50 per cent. This is a consideration when large stocks of cheese are being dealt with. Also, one may remark on general grounds that the comparative value of cheese stocks that have been well looked after is often much higher weight for weight.

Ripening Temperature

A very important detail that affects this item of loss of moisture is the temperature at which the cheese is ripened immediately subsequent to drying after coming out of press. From the point of view of getting the cheese into quick saleable condition, there is an advantage to the maker in having a reasonably warm temperature in the ripening room, say of 65° F.

The stock loses more weight, but the chemical changes associated with the mellowing of the crude curd soon get started and proceed rapidly under such favourable conditions. Only where the cheese is deficient in the true ripening ferments will the process be delayed at such a time, and even so, some untoward form of fermentation is apt to set in leading to rot and early decay.

Cheeses that are matured at a temperature as high as the figure stated are not of the best for subsequent storage by the wholesaler or packer. They are very apt to have a short life at maturity, unless they are of the firmest Cheddar character, and even then they are likely to develop a hot taste, be too strong for the palate, or too highly flavoured for "process" work, except for blending, when a small proportion of highly flavoured cheese goes a long way. The condition of the cheeses used in these further manufacturing processes has to be carefully taken into account to ensure regular and consistent results.

From the financial point of view, as a set-off against the prolonged period of keeping, and as an addition to the saving of weight secured by the slow ripening of cheese under approved conditions of

storage, it has been tabulated from test lots—each lot calculated as originally 100 lbs. in weight—that a difference equal to 4s. 6d. was shown in the price realised for 96 lbs. of cheese, resulting from 100 lbs. cured at a temperature of 40° F. and the sum obtained in the same market at the same time for 92 lbs. of cheese resulting from 100 lbs. cured at 60° F. under precisely similar conditions. That is only a halfpenny per pound, but it is a remarkable result. To give the point full consideration, one must take into account the fact that there would be some further comparative value in the longer keeping qualities of the better cheese, and that this value would be less in proportion as the storage conditions were less favourable in regard to temperature, or, in other words, the better quality cheese would also have better keeping powers. Having been ripened in better surroundings, the sample would be superior to that of the same lot treated differently during the period of maturation.

Of course, the original quality of a cheese is a prime factor. Good conditions of storage during the process of ripening will not mature a bad, nor an indifferent, cheese into a good one, and it is up to the cheesemaker to see that first-class cheese goes into the ripening store, a matter that is not under the control of the buyer. He has to judge of the market value of the cheese, or the suitability for his purpose by its condition at the time of purchase. If it is in an admittedly unripe condition, the faculty of taste cannot be brought into play. It is not often that a regular buyer requires to taste many cheeses; his sense of smell and of feel form the means of adjudication; but, here again, the immature cheese is not ready for the test. A "plug" or "taster" of newly made cheese taken by means of the boring iron has a consistency that affords very little information as to the probable progress of ripening. The texture may certainly show some "body," largely influenced by the amount of fat and moisture in the cheese; and a markedly inferior texture will be betrayed before there is any definite indication of aroma or taste, but this is very much a matter of the variety of cheese that is under consideration.

The next article upon these matters will deal with the treatment of mature cheese in store.

Italian Milk Foods

AN IMPORTANT Italian milk food is termed Roman Ricotta, and is produced by coagulating milk with rennet during cheese manufacture at a temperature of 75° to 80° in the presence of a mineral acid, the resulting whey being heated. Several types of this food are marketed; they differ somewhat in composition, probably depending on the source and composition of the original milk used in manufacture. In general, whole sheep milk and decreamed milk are used, the average compositions of which are as follows:

TABLE I.

	Whole Sheep Milk.	*Decreamed Milk.*
	Per Cent.	Per Cent.
Water	83·10	92·70
Proteins	6·17	1·00
Lactose	4·60	4·90
Fat	5·30	0·75
Ash	0·83	0·65

The composition of the two types of Roman Ricotta as generally prepared is as follows:

TABLE II.

	Type 1.	*Type* 2.
	Per Cent.	Per Cent.
Water	56·60	66·30
Total nitrogen compounds ...	8·51	8·30
Soluble	1·64	1·10
Fatty matter and phosphatides	33·80	23·50
Lecithin	1·16	0·94
Lactose	0·90	1·10
Ash	0·48	0·49
Acidity as lactic acid ...	0·21	0·23
Gram calories per 100 grms....	353	257

There is very little amino acids present, the soluble nitrogen compounds consisting almost entirely of proteoses and peptones, the mineral matter consisting of calcium phosphate.

Other Italian milk foods are of the Mozzarelle types; the principal ones are Roman Mozzarelle and Cardito Mozzarelle, the former being prepared from decreamed milk and the latter from partially decreamed milk. Their average composition is as follows:

TABLE III.

	Roman Mozzarelle.	*Cardito Mozzarelle.*
	Per Cent.	Per Cent.
Water	67·00	61·00
Total nitrogen compounds ...	27·00	16·00
Soluble nitrogen compounds...	5·10	2·15
Amino nitrogen	0·25	0·12
Fatty matter and phosphatides	3·00	20·00
Lecithin	—	1·05
Lactose	Trace	0·50
Ash	2·42	2·40
Gram calories per 100 grms....	139	253

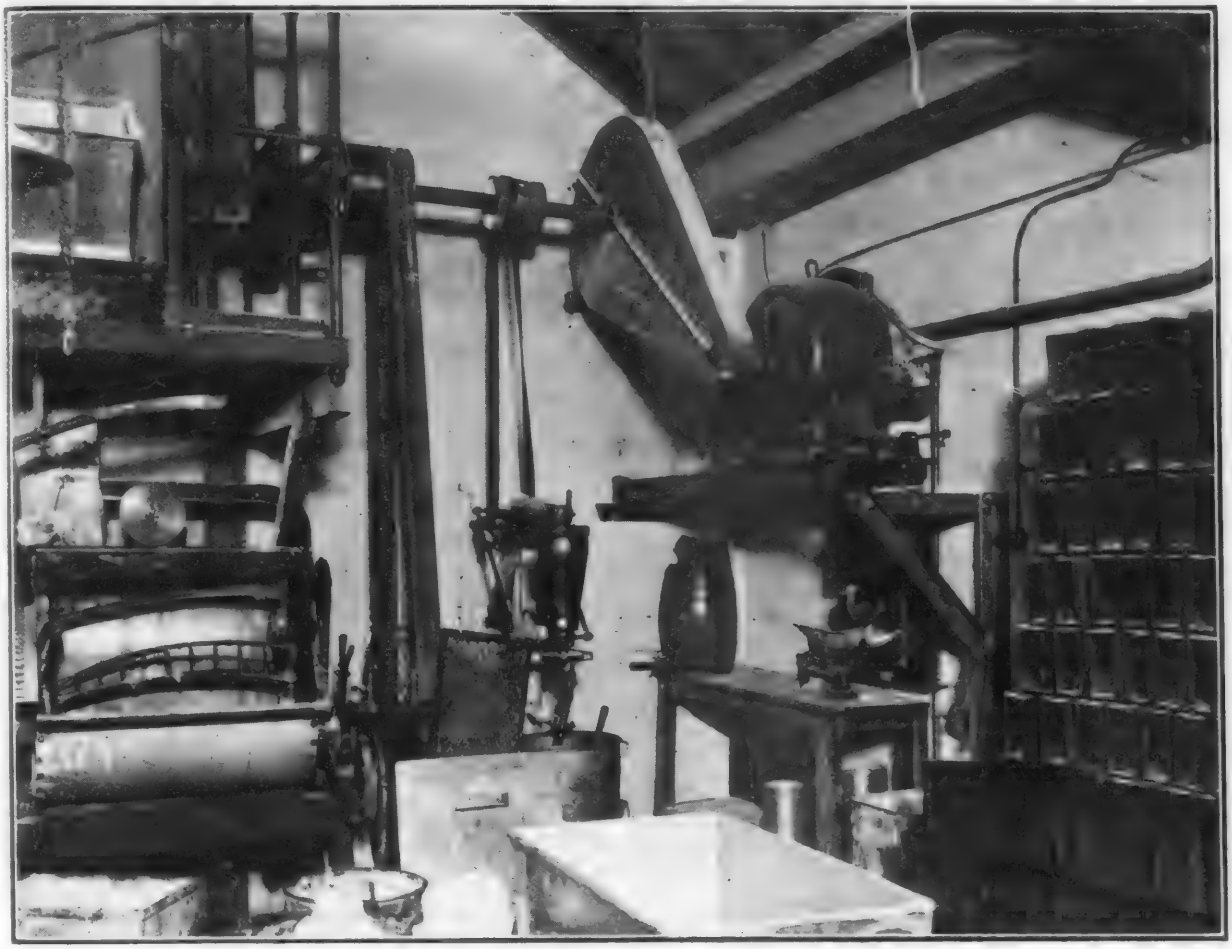
The soluble nitrogen compounds of the Mozzarelle milk foods consist very largely of proteoses, peptones, and a high percentage of amino acids. The ash content consists of about 47 per cent. sodium chloride and 30 per cent. calcium phosphate with lesser quantities of the phosphates, chlorides, and sulphates of sodium, potassium, and magnesium. The calorific value is based on the analysis, and shows that the Cardito type is superior from the alimentary and energy standpoint to the Roman Mozzarelle type.

(Extract of an article by Settimj, which has appeared in "Atti. R. Accad. Lincei," 1928, Vol. VII., pp. 586/589.)

Power Economy in the Food Factory

By "KILOWATT"

PART III



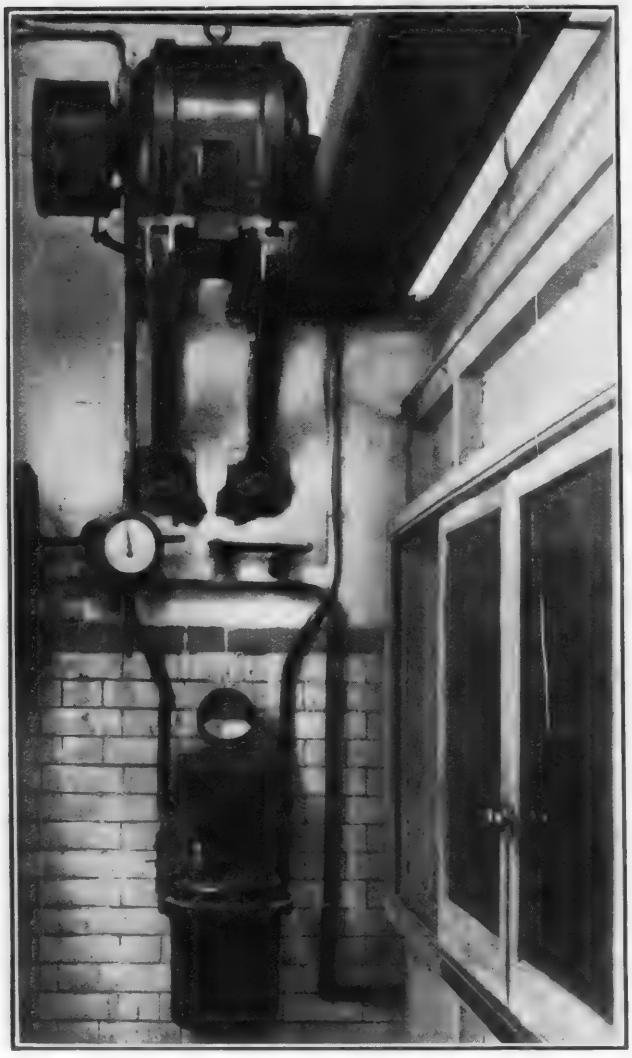
A Short Centre Drive from Motor to Shafting through Chain Transmission.

AS SOON as a decision has been reached regarding the source of supply of electric power—whether from the public mains or private generation—we are faced with the question of the most suitable type of motor to instal for driving the plant, and here a note of warning must be given, for although much has been written regarding the economy, convenience, and reliability of the electric motor as a form of prime mover, it does not follow that all the possibilities of this form of prime mover are realised by the installation of a few motors. The whole argument for "electric drive" is aptly expressed by saying that electricity scores on account of its secondary advantages. Many of these advantages are collateral rather than direct, and, in order to secure these benefits, careful consideration must be given to existing conditions. There are cases where electric driving has been substituted for other methods without the desired economic results being obtained.

Choosing the Right Motor

This state of affairs may be traced to mistaken application or causes which can be remedied. For instance, a knowledge of the types of electric motors available is desirable, as the selection and purchase of the right machine is of vital importance.

To a large extent this choice must be governed by the system of supply available, alternating or direct, but in either case such details as the class of work which the machine has to perform—speed, size of motor in relation to its duties, atmospheric conditions, location of motor—have also to be borne in mind.



Motor mounted on Wall Bracket.

Electric motors fall into two distinct classes: (1) Alternating current motors; (2) direct current motors.

These classes are subdivided thus: A.C. motors—(*a*) Induction type (squirrel-cage or slip-ring); (*b*) commutator type. D.C. motors—(*a*) Shunt wound; (*b*) series wound; (*c*) compound wound.

Characteristics of A.C. Motors

Of the two types of alternating current motors available, the induction machine (squirrel-cage or slip-ring pattern) is largely used, and a brief outline of its construction may be of assistance in understanding its characteristics.

It consists essentially of two main parts called the "Stator" and the "Rotor." The stator, or fixed part, consists of a cylinder, on the inner periphery of which is a number of slots to receive its windings. It is wound to suit the number of phases, periodicity, and voltage of the electric supply on which the motor is to be used, and in such a manner as will give the required speed. The rotor is supported upon the shaft from which the mechanical power is taken, revolving within the stator. The winding is arranged on the outer periphery, and the rotor is not connected electrically with the stator nor with the supply mains. The flow of the currents in the rotor conductors is due to the inductive effects of the stator, thus the term "induction motor." The difference between the two types of induction motors, squirrel-cage and slip-ring, lies in the arrangement and connection of the rotor conductors. In the former, the windings consist of copper bars connected by end rings (thus resembling a squirrel's cage), and are thus short-circuited, whereas in the slip-ring motor the rotor circuits are brought out to slip rings in order that external resistance may be connected in the rotor circuit. This arrangement enables the current drawn from the mains to be controlled and a large starting torque obtained without excessive current being taken from the mains.

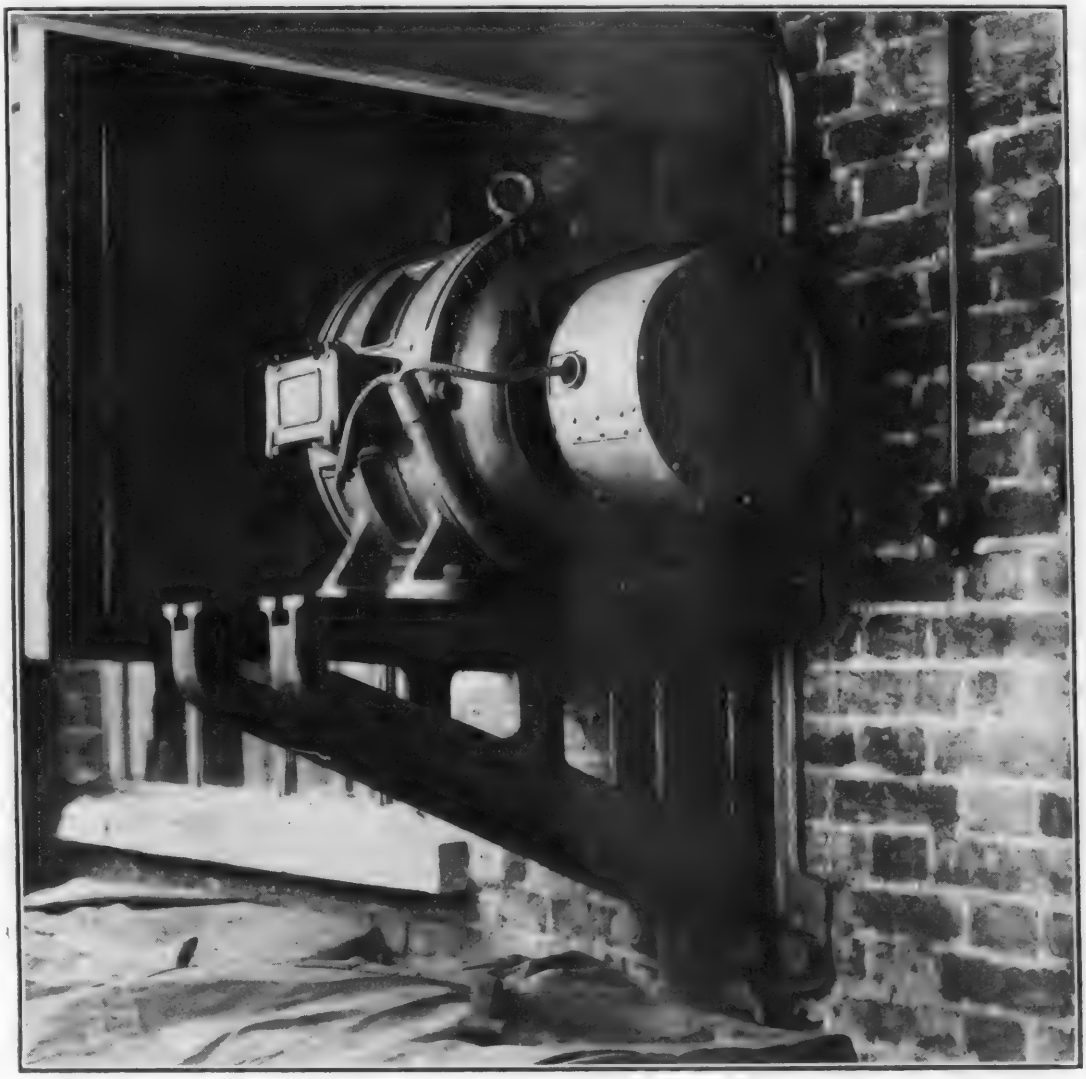
As regards the working characteristics of these two types of motors, the squirrel-cage motor, in starting up, takes an excessive current, the amount varying with the starting torque and the voltage applied to the motor. With large-sized motors such rushes of current may affect the pressure of the supply circuit, and for this reason there are some supply authorities who limit the permissible starting current taken by induction motors on their mains. There are certain means of reducing the amount of current so taken on starting up, but it is usually at the expense of the efficiency of the motor itself.

Nevertheless, owing to the extreme simplicity in construction, the squirrel-cage motor is a remarkably robust machine, and is particularly suited for service under conditions where only unskilled labour is available. It has no commutator, brushes, slip-rings, its maintenance, therefore, being reduced to a minimum. Moreover, it is cheaper than the slip-ring motor.

While slip-ring motors have not the simplicity and absence of running contacts of the squirrel-cage machine, they are valuable where speed variation is required, or a high starting torque essential. This speed regulation is obtained by varying the amount of resistance in the rotor circuit—*i.e.*, by leaving some of the rotor resistance continually in circuit. The speed automatically adjusts itself to the torque, or, in other words, the speed varies with the load. As the efficiency of slip-ring motors is reduced almost in equal ratio with the reduction of speed, it is not advisable to use this machine for running for long periods at less than full-load speed.

The D.C. Motor

The three classes of direct current motors are somewhat more complicated in construction than the A.C. motor, but it must not be imagined that they are unsuitable for use in the food factory. The shunt wound D.C. motor is practically a constant speed machine, the speed at full load being only a little less than at no load. It can be designed for variable speed, and forms a suitable drive for a varying load where constant speed is required. Series wound D.C. motors offer a very large starting torque, and



Motor mounted on Wall Bracket, outside Factory, and exposed to all Weather Conditions.

are capable of exerting an enormous torque for short periods and heavy momentary overloads. This type of motor is eminently suitable for cranes. The third class of D.C. motor, the compound wound, carries a high-starting torque, combined with approximately constant speed at all loads, and is used for driving haulage gears or machines having an uneven load.

The Synchronous Motor

There is another type of electric motor available for driving the machinery in a food factory, the synchronous induction motor, but in order to appreciate the working characteristics of this machine it is essential that the power user should understand the operation of the electric motor and the meaning of its efficiency.

It has been seen that electricity is supplied on one of two systems, and the power user, in order to convert this electrical energy into mechanical energy, calls to his aid the electric motor as the machine to effect this conversion. In the process of conversion, a portion of the electrical energy is absorbed by the motor itself, and the amount of this loss determines the efficiency of the motor. Thus the efficiency of an electric motor is the relation between the electrical energy (watts) put into it and the mechanical energy (B.H.P.) given off. It therefore becomes of great importance that motors of proper adaptability and efficiency be installed.

To find this efficiency, multiply the B.H.P. given off by 746 and divide by the actual number of watts input.

$$\text{Efficiency of motor} = \frac{\text{B.H.P.} \times 746}{\text{watts input}}$$

A small increase in the efficiency of the motor may have a considerable bearing on the financial aspect of the installation, as will be seen from the following comparison:

A 10-h.p. motor of 90 per cent. efficiency takes

$$\frac{7,460 \times 100}{90} = 8,288 \text{ watts,}$$

whereas a motor of 80 per cent. efficiency takes

$$\frac{7,460 \times 100}{80} = 9,325 \text{ watts.}$$

This shows a difference in consumption of 1,037 watts.

Working eight hours per day for 300 days a year, with current at 2d. per unit, the higher-efficiency motor will save

$$\frac{1,037 \times 8 \times 300 \times 2}{1,000} = £20\ 15s.\ 0d.\ (approx.),$$

so that the less efficient motor costs an extra £20 a year to run, capitalised at 5 per cent. = £400.

The high-efficiency machine has, therefore, a considerable bearing on the economic operation of the plant, and it is this point that introduces the question of the application of the synchronous motor. Manufacturers have accordingly designed a machine known as the auto-synchronous motor, which is really a special form of induction motor; it starts up against any reasonable load required in a similar manner to the ordinary induction motor—that is, by resistance in the rotor circuit. When the resistance is all cut out, the motor continues to run as an ordinary induction machine—that is to say, it has a small slip, consequently it does not run at exactly synchronous speed. By applying a continuous current to the rotor windings, fixed poles are obtained in the rotor, causing this latter to pull into synchronism with the rotating field in the stator.

As indicated above, the low power factor of machines running light affects adversely the total power factor, so that while the individual power factor of each machine is good at full load, the fluctuations in the load of the whole installation bring the average power factor down to a low value. An auto-synchronous motor, on the contrary, running at light load will tend, according to its design, to give a greater leading wattless component available for advancing the power factor of the total installation; thus a fluctuating load is no disadvantage to an auto-synchronous motor.

With the exception of certain internal modifications, an auto-synchronous motor is essentially the same as an induction type, with the addition of a D.C. exciter belt driven by, or direct coupled to, the motor. The control gear is precisely the same as for an induction machine, consisting of circuit breaker with the usual protective devices and interlocked rotor starter. The motor is started up in the usual manner as an induction motor by closing the main switch and gradually cutting out the starting resistance. While running up to speed the exciter builds up the magnetising current, and on approaching full speed the motor pulls up automatically into synchronism.

Overloading

Should the auto-synchronous motor become heavily overloaded nothing serious happens, as directly the machine falls out of step it will continue to run as an induction motor. This is a valuable feature under practical working conditions. When out of synchronism the motor recovers immediately the characteristic of an ordinary induction motor, with its heavy overload torque, and when the excessive overload is removed it again pulls automatically into synchronism and resumes its duty of correcting the power factor without any attention.

These machines are suitable for medium and large outputs for continuous running where no speed regulation is required.

(Continued from following page.)

Gassing

Further investigations regarding porosity of white sheet disclosed the following: When the iron plate is treated in the acid bath it is known that hydrogen arises. This hydrogen only partly escapes. Another part is consumed in the uppermost layers of iron for the formation of the iron-hydrogen combination, and is partly occluded. In the hot tin bath the occluded and also partly chemically combined hydrogen is liberated—that is to say, the plate "gasses." The very small gas bubbles now produce pores as already described. Whilst the previously described formation of pores constitutes a defect in the manufacture of the white-plate, the formation of pores as the result of the gassing of the plate constitutes a normal feature in the usual methods.

Porosity Test

The test for porosity in white-plate is carried out as follows:

A piece measuring 9 by 12 cm. is cut out of the plate to be investigated and flattened out as much as possible. After thorough rinsing (avoiding, however, the use of brushes), the plate is placed for two minutes in a flat bowl containing 5 per cent. sulphuric acid, and then taken out and thoroughly washed with water. The plate is now placed in another flat bowl, into which a warm solution of 7·5 gr. gelatine, 2·5 gr. glycerine, and 1 gr. potassium ferricyanide in 100 ccm. water is poured. It is allowed to stand for 24 hours untouched. The counting of the blue points which have arisen is effected by the superposing of a counting-plate divided into 24 sq. cm., the observation being carried out with the *naked eye*. A plate is normal or not excessively porous when there are only 1 to 3 points per square; it is of medium porosity when there are 4 to 12; and very porous when there are more points, spots, or stripes.

Book Received

Nutrition, W. H. Eddy, Ph.D., pp. vii + 237. 37 tables. Baillière, Tindall and Cox, London. 1928. Price 11s. 6d.

Tin-Plate for Cans for Preserved Goods

By DR. HERMANN SERGER,
Director of the Brunswick Research Station for the Preserving Industries.
(*Translated from the German.*)

Some important results of work carried out at the well-known German Research Station under the direction of Dr. Serger are given below.

PART II

THE BASIC points to be taken into consideration in judging the plate (white sheet metal) used for cans are the following:

1. The tensile strength of the plate should be 33 to 36 kg. to the sq. mm.

2. The plate should not be brittle or fragile; it should be able to stand quintuple folding and refolding at the same place under reasonable pressure.

3. The iron material of the tin-plate should be uniform, homogeneous, and as free as possible from admixtures of graphite, phosphates, oxides, and so forth.

4. For cans of a size containing more than 2½ kg. (large cans), the thickness of the plate should be at least 0·31 mm. and at most 0·33 mm.; for sizes containing ½ up to 2½ kg. (medium-sized cans), at least 0·26 mm. and at most 0·28 mm.; and for sizes under ½ kg. (small cans), at least 0·22 mm. and at most 0·24 mm.

5. The tinning should be absolutely lead-free and should weigh at least 0·15 gr., or better still 0·20 gr. per 100 sq. cm. on one side of the plate—*i.e.*, taking both sides into account, 0·30 gr. or 0·40 gr.

6. The white-plate should have few, if any, pores which can be detected by the potassium ferricyanide gelatine test. No plates must be used which are damaged at many places, or are streaky, blistered, or have a yellow tarnish.

Pitting

Various defects may be observed in white sheet metal; for instance, dark pittings after the rolling process, which is a proof that these can only be small particles rolled into it. These particles form more or less dot-like pittings. The amorphous material in the latter absorbs moisture and especially, also, acid and corrosive solution, and releases them in the tinning bath slowly on to the surrounding sheet metal surface. A tin blister is formed which breaks shortly after removal from the tin bath and causes the pitted structure of the pores on the white-plate. As the tin in the pitting, on the breaking of the blister, collapses from without inwards, and the water or the acid vapour escapes in the middle, the tin there cools more quickly than at the edge, and can no longer flow together. A tubular connection between the external air and the iron arises, which is the pore. As the rolling in of very tiny particles cannot be entirely avoided, the actual porosity could, indeed, be reduced to a minimum, but not completely eliminated.

Graining

In addition to the actual porosity there is graining (or scarring) of the plate. This is due to the fact that the iron is not sufficiently freed from oxide by the pickling processes so that a small, isolated spot, which is, however, much larger than the actual pores, is not adhered to by the tin and is therefore left exposed or only coated over lightly, sometimes crescentic in shape. This concealed graining (or scarring) also frequently contains passages of a capillary nature affording communication between the plate and the external air, so that it reacts like actual pores when the potassium ferricyanide gelatine tests are made. The graining is probably due to the overheating of the plate or to the presence of extraneous matter in the crude iron, which occurs in a granular form and is different from the basic composition of the iron mass. Careful supervision of the melting process of the iron should be capable of lessening this defect.

The graining may increase owing to the defective adhesiveness of the tin on larger surfaces of the iron-plate. In this case, larger grains seem to be distributed in the homogeneous iron on the rolled surface. The corrosion tests on crude plates have proved this assumption to be correct. Without doubt, it is correct to say that between the iron and the tin in the white plate there is an intermediate layer of alloy. The optimum of the alloy can only be obtained with an optimum composition of the iron. An optimum composition of this kind should be afforded by an iron of the composition as indicated below. If one or more constituent part predominates, the optimum is disturbed and the alloy does not occur at all, or if it does, then only in a slight degree. The standard optimum composition of iron suitable for tinning purposes should be the subject of further investigations.

Composition of Iron

The composition of the iron for the manufacture of white plate so far recognised as optimum is the following:

Kind.	*C.*	*Mn.*	*P.*	*S.*	*Si.*
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent
4L	0·10	0·60	0·08	0·04	0·02
2L	0·09	0·55	0·08	0·03	0·02
JCL	0·07	0·53	0·06	0·03	0·03
JC	0·06	0·52	0·05	0·03	0·03
1X	0·05	0·50	0·04	0·03	0·03
4X	0·05	0·50	0·02	0·03	0·03

(*Continued on previous page.*)

Nutritional Bread (Honey)

By J. BOYD

Honey Bread

3 lbs. strong flour.	2½ ozs. lard.
¾ oz. glucose.	¾ oz. salt.
2 ozs. honey.	2 ozs. milk powder.
1 egg.	1½ ozs. sugar.
2 ozs. yeast.	2 lbs. water.

BROWN IN oven 18 ozs. of the flour, then pass all flour through a sieve and mix thoroughly with this the milk powder; make a print, into which place all but the yeast. Water at 112° F. and make into nice dough; the yeast should be dissolved in water about 95° F. and added to mixture when half doughed up. Put into hot corner for 30 minutes, knead well, allow to lie a further 30 minutes. Then weigh at 15 ozs. each loaf. Mould and put into prepared tins; after another 20 to 30 minutes the loaves should be ready for baking. As a matter of fact, this type of bread is put up in all manner of shapes and sizes to suit customers.

To many, this may seem rather a sweet mixing for a loaf; it is, and that is where its chief attraction lies for the "Honey People." It may surprise many readers to know that there are great numbers of people who will purchase practically anything that has honey as a constituent.

So far as I have been able to find out, those honey lovers feel beneficial effects from partaking of the honey in various forms, and have naturally become devout devotees at the shrine of the honey bee.

To the ancients honey was of very great importance as an article of diet, being almost their only available source of sugar. It was valued by them also for its medicinal virtues, and in recipes of the Saxon and later periods it is a common ingredient. Honey is mildly laxative. It consists of about equal parts of dextrose and levulose, and during its stay in the body of the bee, the sucrose, which is the chief sugar abstracted, becomes inverted into dextrose and levulose.

Analysis of Pure Honey

	Per Cent.
Sucrose	0·5 to 7·6
Invert Sugar D. and L. ...	60·3 to 78·8
Ash	0·03 to 0·5
Water	12·0 to 33·0

Eggs

Eggs are one of the most important of the raw materials used in the bakery or the household.

Their chemical composition is such that they greatly enrich all other materials with which they are blended; the improvement effected in increased food value being of paramount importance.

An egg contains in primitive form all that is necessary to form blood, bone, muscle, and, indeed, all the tissues of the young chick.

Yeast

is one of the most valuable vegetable growths applied to the service of man. Its botanical history goes back to the time before man had arrived on the planet. The yeast manufacturer, who raises the little yeast cells, requires to watch their development very carefully. This can only be done by microscopical examination of the yeast, because the cells are invisible to the naked eye. It is astonishing to think that ten million yeast cells can be accommodated on a penny, and goes to show that only lenses of tremendous magnifying power could be of any service to investigators.

Bakers, when buying yeast, should go by the quality rather than price.

The determining factor for all yeasts is, of course, its fermenting qualities and flavour in the baked loaf. A good yeast is practically worth its weight in gold, and great credit should be given the various yeast manufacturers for the great strides they have made in this great food. Bad or uncertain yeast never yet produced bread of best quality, and never will, so it is for the baker first of all to find out which yeast suits him best and then to stick to it. As all those materials I have enlarged upon are included in the above recipe, it will be readily understood why honey bread holds an important position in food manufacture and why it is usually wrapped in cellophane paper, with two attractive paper seals affixed.

A bright blue-green oval seal with a gold centre and edging makes a most effective show for this loaf, when purchased in large quantities. Those seals really cost very little, and they help the selling power of the bread. The days of just simply dumping goods into a shop in any old way are past now, and it is the trader who shows off his goods to the best advantage who gets the clients, and surely, if a good quality speciality such as honey bread is made, the least that can be done is to give it a fitting finish by an artistic wrapping.

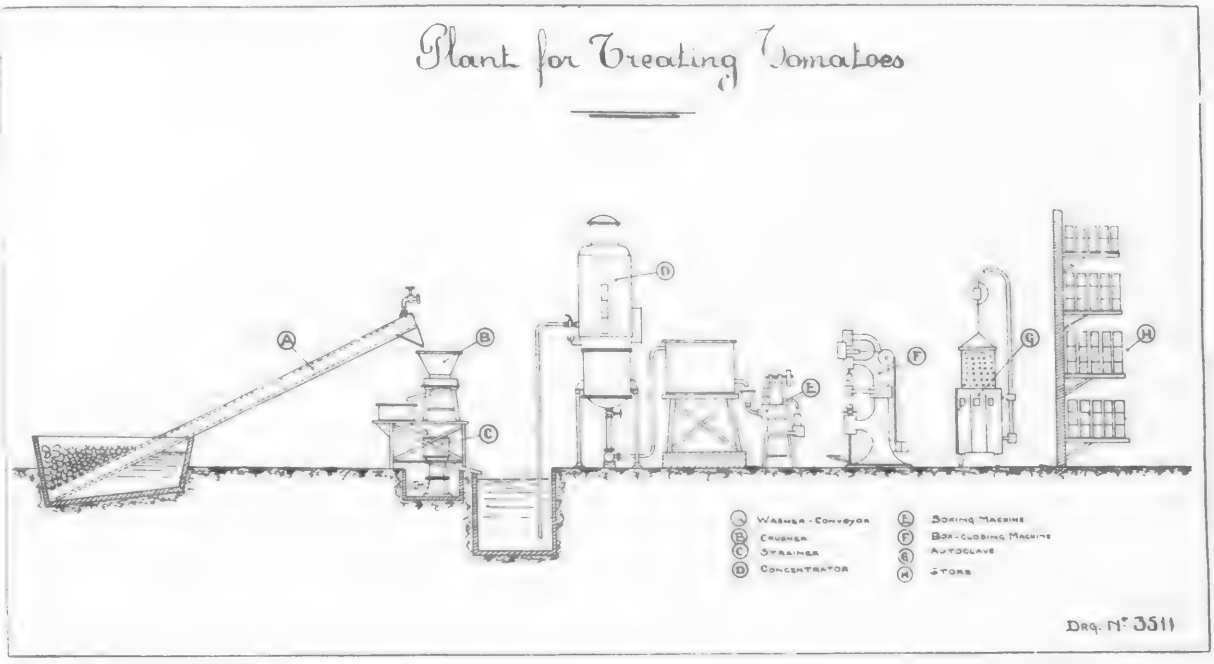
Powdered Fruit Juices

WE understand that arrangements have just been completed for the installation of a plant in San Juan, Porto Rico, for the conversion of fruit juices to powdered form by a process said to be similar to that used in making milk powder. Surplus juice resulting from the canning of grape-fruit and pine-apples will be used as raw material. The product is intended for use in bakery products and in other preparations where liquid flavouring materials cannot be successfully used. If the project proves a success, extensions are planned.

Concentration of Fruit, Vegetable, and Meat Juices

By CH. LEMALE

This article, translated from the French, is an interesting discussion of the main factors involved in the concentration of fruit, vegetable, and meat juices, with particular reference to tomatoes and it gives some particulars of the Lemale concentrating plant.



THE PROBLEM of concentrating food products is one which is of the utmost economic importance throughout the world.

Concentration consists simply and solely in removing, by evaporation, a greater or less proportion of the water contained in the food to be concentrated.

This process has, of course, been applied to the treatment of fruit, vegetable, and meat juices for some considerable time. It is only relatively recently, however, that serious attention has been given to effecting concentration in such a way that not only is the flavour or essential aroma of the juice retained in the concentrate, but also that the vitamin content of the original food—be it animal or vegetable—is not in any way affected. In other words, the quality, as well as the quantity, of the concentrate must together form the criterion of its success as a world-wide food commodity.

It is obvious that, given the possibility of securing a perfect concentrate of this or that original food product, entirely new possibilities of business are opened up with overseas countries, the export of whose produce may have been hitherto attended with serious—in some cases insuperable—difficulty.

To take one example only: It is a well-known fact that wine concentrates are even now being exported from Australia, New Zealand, and various parts of North Africa. Where the cost of exporting the finished wine in cask would place such business outside the region of practical politics, it is a very simple matter to ship concentrated wine products of greatly reduced bulk; such concentrates, having a sufficiently high sugar content, are not susceptible of deterioration due to fermentation.

It goes without saying that the real solution of the problem lies in the production of a perfect concentrate. Nothing short of this is of any commercial or economic value. In the case of wines and ciders particularly, the concentrate must be beyond reproach, so that merely by dilution under suitable conditions reconstitution can be effected without loss of flavour, without any biological change, and without affecting colour.

The difficulty about many concentrates is that they inevitably have a "cooked" taste instead of presenting the flavour or aroma of the original material. Thanks, however, to ever improving methods of evaporation and concentration, it is now perfectly feasible to produce—from any material susceptible of evaporation—a concentrate possessing all the valuable attributes of the original fruit or vegetable.

The principal physical requirements of the ideal evaporator are as follows:

1. It must be of such a design that evaporation can be effected at a low temperature under high vacuum. The importance of this will be appreciated when it is realised that the albuminoids are destroyed at a temperature of 40° C. (104° F.), while the vitamins suffer equally at an even lower temperature—viz., 37° C. (98° F.).

With a properly designed and constructed evaporator, in which the joints are properly made and attended to, so as to prevent the re-entry of air into the system, the temperature of ebullition will only be some 12° C. higher than that of the water of condensation.

2. The temperature of the heating surfaces of the evaporator must be kept relatively low and must, moreover, be susceptible of easy regulation in order to suit the character of the desired concentrate. This is of particular importance in dealing with products of delicate flavour.

Control of the temperature is best effected by connecting the drain from the body of the evaporator to the vacuum pump (or vapour condenser), by which means a relative diminution in pressure and temperature is produced in the heating element of the evaporator. It is possible by this means to control exactly the temperature of the heating steam and, therefore, the concentrating process.

It is when the concentrate comes into contact with unduly hot surfaces that biological destruction occurs and that a "cooked" flavour is developed. The temperature of these surfaces exerts a greater influence on the concentrate than does the actual temperature of the liquor itself.

3. Naturally, the evaporator must be constructed of material best suited to the nature of the product to be concentrated.

This is an important point to which sufficient attention is not always directed. Further, the design should provide for free and lively circulation of the liquid to be concentrated, so as to reduce the period during which the concentrate may remain in contact with the hot metal surfaces.

Certain fruit juices contain a delicate flavour or aroma, the essential vapours from which are extremely volatile and are not condensable under vacuum.

It is indispensable that these volatile essences or vapours should be recovered because, in their absence, the fruit juices lose their delicate and characteristic flavour.

So difficult is the retention of these flavours by ordinary concentrating processes that it is quite common practice to try to balance their loss by adding to the concentrate the flavour from some other fruit or even some synthetic flavouring. On the other hand, by employing recognised modern methods of concentrating, it is not only possible, but is a matter now of daily experience, to preserve the original delicate flavour and to dispense with added makeshifts.

To effect this desirable end, it is necessary to employ a plant designed specially for the purpose, and to see that such plant is kept definitely air-tight to prevent, at all costs, the re-entry of air into the system.

Air has a definite capacity for absorbing these volatile essences, up to saturation point. It forms an excellent vehicle for their transmission or removal, but it is commercially impossible to separate and recover these essences from the air. On the other hand, if suitable plant is employed and re-entry of air to the system is ruled out, these essences are condensable and can be recovered by introducing a small surface condenser at the right point in the system.

By this method, completely successful concentration can be effected of grape pulp or grape juice, cider and perry, limes and oranges, other fruit juices generally, pectine (destined for the manufacture of jams and jellies), milk, tomatoes, etc., etc.

In recent years the *concentration of tomatoes* has assumed quite important dimensions. A large number of installations have been put down in France, Spain, and Italy for the manufacture of tomato extract, which is now so widely used in the preparation of sauces, chutneys, pastes, soups, etc.

By employing suitable plant it is now customary to reduce the fresh material to about one-seventh of its original volume; while original tomato juice has a solid content of approximately 4½ per cent., the resultant extract contains as much as 35 per cent. of solids, which contain exactly the original flavour and maintain the original colour of the fresh fruit.

Two illustrations are appended to this article. The first shows a typical tomato concentrator, being one of several installed in the neighbourhood, belonging to the Société La Catalane at Perpignan, in France. This plant is capable of treating comfortably 20 tons of tomatoes per hour.

The second or diagrammatic illustration indicates the general arrangement of the whole installation. First of all, the tomatoes are washed to ensure surface cleanliness. This is effected by spraying the fruit with water as it passes over a suitable conveyor which delivers it to the crushers or pulpers. From the latter, the pulp is passed over suitably designed strainers, which remove the skin and pips. From this point, the juicy pulp is withdrawn, under vacuum, to the evaporator, which concentrates the material by the removal of 85 or 86 per cent. of water from the juice.

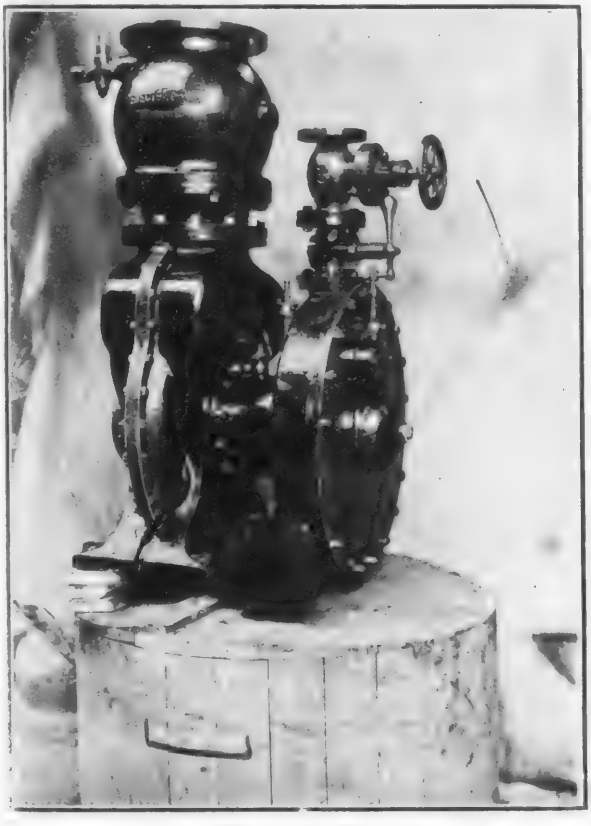
It will be obvious that here is the crux of the whole process—the concentration of the pulp while retaining not only the full flavour, but also the pleasing colour of the original. Now this can only be done by employing an absolutely air-tight process under high vacuum, and, consequently, at a relatively low temperature. With an unsuitably designed plant, the concentrate can hardly avoid acquiring a "cooked" flavour, with corresponding detriment to colour. The Lemale evaporator, which is universally used on the Continent for these processes, is of very simple and straightforward construction.

This permits of rapid circulation through short straight tubes, which are very easily cleaned although the rapidity of action and the low temperature of concentration do not permit of any important deposit on the tubes and heating surfaces generally. The whole system is maintained under high vacuum by the Lemale ejecto-air pump or condenser, in which a very high degree of vacuum is attained and maintained, merely by passing a certain volume

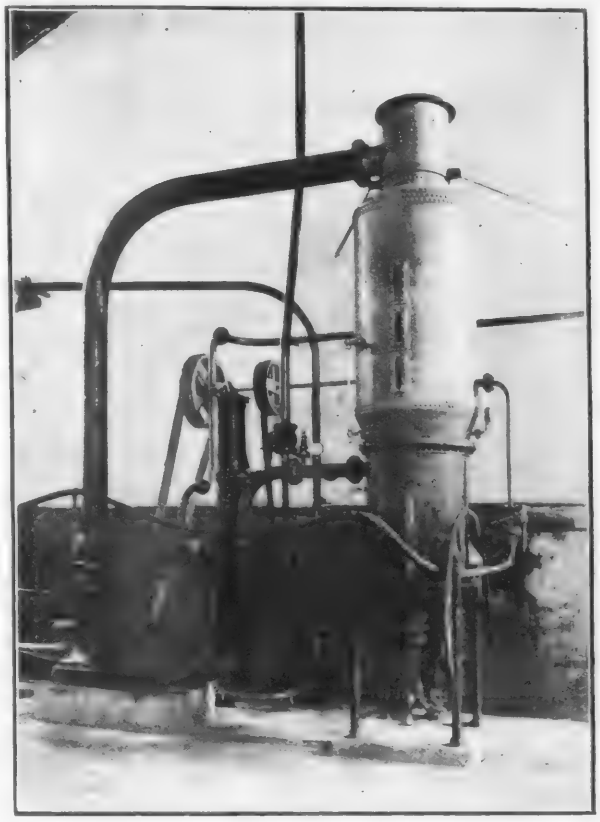
of water in the form of a great number of jets between two specially designed metal discs. There are actually no moving parts in this machine except the rotor or impeller itself. There are no valves to be ground in from time to time, no piston rods, no pistons, no packings, merely a rotating impeller discharging water through a specially calculated and designed passage.

Further, while this machine may, of course, be operated by any suitable means, such as an electric motor or by belt or chain drive, all the more recent plants are fitted with a small steam turbine coupled direct to and operating the rotary vacuum pump. As steam is required in any case for evaporating purposes, what more simple than to pass this steam first through a small turbine, to drive the vacuum pump or vapour condenser? The oil-free clean exhaust steam from this turbine is then taken direct to the evaporator, with the result that the vacuum pump costs nothing for power to operate it—an important item in a big installation working continuously.

Arrangements are also made to permit of additional live steam, at a suitable pressure, being admitted through a special injector to the heating portion of the evaporator. As stated above, the ejecto-air condenser or vacuum pump operates by the continuous passage of high velocity water jets. The usual arrangement provides for a small circulating water tank placed alongside the pump. The latter draws directly from and discharges back directly into this tank. If and when the temperature



Lemale Ejector Air Condenser.



Tomato Concentrator.

of the circulating water rises to such a point as to cause a reduction in vacuum, fresh cold water is added to the tank, which is also provided with a warm water overflow. Where a reasonable supply of fresh cold water is not available, the warm circulating water is pumped up to a spray cooler, whereby its temperature is sufficiently lowered to permit of its use over and over again.

As the concentrate, or extract of tomato, produced by this system possesses a quite definite consistency, an extraction pump is provided, below the evaporator, to permit of the extract being withdrawn as required, while operation otherwise is continuous. This extraction pump discharges the concentrate into a convenient receptacle from which, in turn, the cans are filled. These are then passed to a stoving arrangement, where a certain degree of heat is applied to the cans and their contents, in order definitely to sterilise the latter.

In the case of tomatoes, as well as in milk concentration, it is desirable to sterilise the ultimate product for canning: there is then no possibility of fermentation.

The description and illustrations refer particularly to the Lemale concentration plant, which is widely established in nearly every country in Europe for concentrating every kind of fruit, vegetable, and meat juice. Messrs. Charles E. Douglas and Company, of Cecil Chambers, 76, Strand, London, W.C.2, hold the British rights for this system and will be glad to answer any inquiries relating thereto.

Recipes

Assorted Bon-Bons

THERE ARE very few lines that are more attractive than a good range of crystallised bon-bons. The colours should be of the most delicate tints, nicely marked with wire fork or decorated with various toppings—*i.e.*, floral petals, nuts, or fruit, etc.—according to the flavour of the interior and the colour of the cream coating, and, last but not least, the finish and the process of crystallising. The centres can be made from an almost endless variety. We shall first begin with a type of bon-bon made from a fondant cream base so that the manufacturer may economise by making one base, instead of one for the centres and another for the coating.

Ingredients:

100 lbs. best granulated sugar.
24 lbs. glucose.
4½ galls. water.

Method.—Put the sugar and water in the steam pan and set on the steam at half pressure, and continually stir with the spatula until the mixture boils. See that all the sugar crystals are melted, then strain through a fine mesh sieve and replace in the pan again, then add the glucose, set steam on full, and boil to 242° F. When this temperature is reached, shut off steam and pour the mixture into the cream melangeur, or on to a cold marble slab, previously sprinkled with a little cold water, and also sprinkle a little on to the top of the poured batch, to prevent it forming a crust. The quicker the batch has cooled the better will be the result. Begin to turn the batch as soon as the finger leaves an impression. When it becomes an opaque solid mass, turn into tanks and cover. This causes it to become mellow. The next things to be made are the centres. Choose the shapes—*e.g.*, round, square, oblong, diamond, olive, oval, and triangle, etc.—make the required impressions in starch, and begin to melt the cream. Have the melting pan perfectly clean for each colour and flavour.

White (Vanilla).

10 lbs. of fondant cream.
¾ oz. vanilla essence.
6 ozs. sugar syrup.

Melt the cream slowly while breaking up with the spatula (this is preferably done in a steam bath). When all is melted, add the sugar syrup and vanilla essence, run in the impressions of starch at 150° F., allow them to set until the following day, when they will be ready for dipping, and then clean and brush them from any adhering starch.

Orange.

10 lbs. fondant cream.
1½ drams orange flavour.
½ oz. citric acid.
Orange colour.
6 ozs. sugar syrup.
½ lb. chopped orange peel.

Same method as for Vanilla, always adding the colours first and the flavours last.

Add the chopped orange peel just before colouring and flavouring.

Cherry.

10 lbs. fondant cream.
¾ lb. finely chopped cherries.
½ oz. citric acid.
6 ozs. sugar syrup.
1 oz. kirsch essence.
15 drops almond oil.
Pink colour.

Add the chopped cherries and proceed as for Vanilla.

Pistachio.

10 lbs. fondant cream.
6 ozs. sugar syrup.
½ oz. pistachio essence.
Green colour.

Proceed as for Vanilla.

Pine-apple.

10 lbs. fondant cream.
6 ozs. sugar syrup.
½ oz. pine-apple essence.
1 lb. finely chopped preserved pine-apple.
½ oz. citric acid.
Yellow colour.

Proceed as for Vanilla, adding the chopped pine-apple.

Violet.

10 lbs. fondant cream.
6 ozs. sugar syrup.
20 drops violet essence.
Violet colour.

Proceed as for Vanilla.

Strawberry.

10 lbs. fondant cream.
1½ lbs. strawberry jam.
½ oz. essence of fraises.
½ oz. citric acid.
Carmine colour.

Method.—Melt the cream to 150° F., add the jam which has already been put through a fine sieve, to break up any whole fruit in the jam, then the colour, flavour, and finally the acid.

The sugar syrup is made up in the following way:

Take 7 lbs. sugar.
3 pints water.
½ oz. cream of tartar.

Place sugar, water, and cream of tartar in the pan and bring just to the boil, see that the sugar is melted, and pour through a fine sieve. It is then ready for use.

(Next month's issue will deal with covering and crystallising for bon-bons.)

Sausage Seasoning

An excellent flavouring for sausages, etc., may be prepared with the following ingredients:

1. *Mixed Herbs*, consisting of:

6 parts marjoram.
10 parts savoury.
3 parts basil.
11 parts thyme.
8 parts parsley.
4 parts sage.

All ground together in powder form.

2. *Mixed Spices*, equal parts of:

Nutmeg.
Mace.
Coriander.
Cinnamon.

All being ground together.

To flavour a 56 lb. mix of sausage-meat use the following condiments:

3 ozs. white pepper.
1½ ozs. mixed herbs (as above).
1½ ozs. mixed spice (as above).
½ oz. mace.
½ oz. ground ginger.

The above ingredients should be added to the mixture early in the process of chopping, so that they may be thoroughly incorporated into the meat, thus securing a uniform flavour.

Browning for Gravies

A good colouring for gravies, sauces, etc., is obtained by gently warming in a steam pan

10 gallons caramel.
20 gallons water.
5 gallons soy.

Great care should be exercised in the selection of the caramel to be used, and it should only be bought after testing a sample to make sure it gives the tint of brown required in the finished article.

Trade News

OUR APOLOGIES have been tendered to Messrs. Harrison Carter, Ltd., of Dunstable, the well-known makers of sugar machinery, disintegrators, and other plant for the food industry, for the "printer's error" which surreptitiously crept into our notes on the Confectioners' and Bakers' Exhibition in the October issue. An improved type of sugar grinding and dressing plant, which will produce any grade of icing or castor, was credited to Wm. Gardner and Sons, Ltd., but in reality it is made by Messrs. Harrison Carter, Ltd., of Dunstable. We are informed that this complete plant, which attracted so much attention at the Exhibition, was sold for delivery immediately after the show.

* * *

The scientific cleaning and sterilisation of bottles and jars is of vital importance in the food industry. At the present time there are two schools of thought with regard to the correct method to be employed: they are often known as the "brushers" and the "non-brushers." One of the leading advocates of the brushing method is Thomas Hill, of Hull, whose firm has been concerned with bottle cleaning methods for nearly half a century. The principle adopted is as follows: The bottles are first soaked in a heated alkaline solution, which effectively kills all germs and dissolves the dust and dirt adhering to the walls of the bottle. This is followed by thorough inside and outside brushing on power brushes, combined with scouring and swilling, and then thorough rinsing with clean water.

We have received from Messrs. F. J. Edwards, Ltd., of 406, Euston Road, London, N.W.1, a copy of their Priced Catalogue of Sheet Metal Working Machinery.

* * *

We have also received a booklet from Messrs. Arthur Holden and Sons, Ltd., the well-known varnish and paint manufacturers. This booklet gives a brief history of the firm.

* * *

On Thursday, October 25, a dinner was held at Grosvenor House, Park Lane, in connection with the Universal Cookery and Food Exhibition. The chef of Grosvenor House, M. Claude Georges, was presented with a loving cup by Mr. J. E. Henwood, the chairman.

* * *

Change of Address

MESSRS. H. J. WEST AND CO., LTD., whose former address was 72/4, Gray's Inn Road, W.C.1, have moved to 324, Gray's Inn Road, W.C.1. Telephone Nos.: Terminus 4455 and 4456.

Enquiries

The following are extracts from letters we have lately received. We shall be glad to put interested parties in touch with the writers, or to insert replies in the Correspondence columns.

40. Wanted, a product of a gelatine nature for putting a white glaze on jellies, brawn, and other meats, and also serving as a preservative.

Bacteria and Food Spoilage

By A. BARBARA CALLOW, M.A., M.Sc., M.S.
Author of "Food and Health."

Bacteria are the chief enemies of the food manufacturer, and his great problem is to keep his food preparations under such conditions that bacteria will either be excluded or be prevented from causing spoilage. Liability to bacterial attack varies with each type of commodity, and knowledge of the habits of bacteria is essential when working out conditions that will eliminate food spoilage.

BY FAR the most serious causes of food spoilage are bacteria, yeasts, and moulds, and the up-to-date food manufacturer realises that he must know something of the life-history of these micro-organisms before he can prevent their ravages. The difficulty is that practically all the ordinary human foodstuffs form an admirable medium for the development of micro-organisms. Most natural foods, both animal and vegetable, are rapidly attacked by bacteria, and cooked foods may be even more rapidly spoiled because the process of cooking frequently softens the tissues and makes it easier for the bacteria to penetrate.

Bacteria as Individuals

Bacteria are extremely minute organisms which can only be seen individually when they are examined under a microscope that magnifies at least a thousand times. If immense numbers of bacteria are present in a fluid that was originally clear, they will give it a milky appearance; for instance, water is slightly turbid if it contains about one hundred million bacteria per c.c. Similarly, bacteria, yeasts, and other micro-organisms have to be present on solid materials in tremendous numbers before they are noticeable to the naked eye as a slime, but this is occasionally seen, for instance, on the surface of ham, bacon, etc. The most striking point about the bacteria as a class is their amazing power of producing offspring. If one or two bacteria are placed in nutrient broth at a suitable temperature (37° C. for many bacteria), they at once begin to divide by splitting into two similar parts which rapidly become indistinguishable from the parent cell; these young cells again divide, and so on *ad infinitum*, or rather until the broth becomes so highly contaminated with excretory products that it ceases to be able to support bacterial growth. Under favourable conditions each bacterium divides about every 20-30 minutes, so that in 10 hours one single bacterial cell can give rise to about two million descendants.

Colony Formation

Bacteria also increase very rapidly when they are grown on solid media, such as lumps of potato, or agar jellies containing nutrient broth. If a liquid containing 20 bacteria is spread on the surface of such a jelly, and placed under suitable conditions, each bacterium will form a little round colony containing millions of bacteria, and the following day there will be 20 colonies visible on the surface of the jelly. Sometimes the colonies are so large that they coalesce, and the whole surface of the jelly is covered with a slime-like growth. This is especially likely to occur if the surface of the medium is moist, as in this way the bacteria can either move or be carried by currents from one part to another. This observation has a moral for the food manufacturer. Sometimes tiny pin-head colonies develop on the surface of foodstuffs, and it might be thought a good plan to wipe them off with a damp cloth. Actually this is a bad plan because it spreads the bacterial infection over the whole surface, whereas before it was merely localised.

Classification of Bacteria

In appearance bacteria do not vary very much. Generally speaking, they are either rod-shaped (bacilli) or round (cocci). There may be some special characteristic arrangement, especially in the case of cocci. For instance, Streptococci are recognised by their long chains of cocci, Staphylococci by their clumps of cocci which resemble bunches of grapes, and so on. Some bacilli have resistant spores which appear as rounded portions at one end or in the middle of the rod. But you cannot be sure what bacterium you are dealing with unless you know something more about it than the shape. Valuable information can be obtained by treating with various stains to see what effect they have on the organism; another laboratory method that is useful in this connection is to grow the bacteria on definite culture media, and to see what kind of colonies they produce, whether they produce acid or gas when certain sugars are added, and so on. One important group of bacteria (the anaerobes) can be grown on solid media only in the absence of air, and although the resistant spore forms of anærobes can survive for long periods in the presence of air, they will not germinate unless conditions are anaerobic.

How Food is Infected

We all have a vague feeling that there are a good many bacteria about in dust, etc., but we may be startled to hear some of the actual figures that have been worked out by bacteriologists. English public health experts state that one teaspoonful of ordinary town dust contains over a hundred million bacteria

Dr. Thom, an American microbiologist, found that on the surface of the leaves of one gram of fresh spinach there were two hundred and fifty thousand micro-organisms. Needless to say, these immense numbers of bacteria are not all harmful to man, but a good many of them can cause decomposition of foodstuffs. The most harmful bacteria are those which pass directly from animals to man, or from one man to another. Chapin has emphasised the dangers of the universal exchange of human saliva. As he points out, if indigo were secreted by nose or mouth our fingers would rapidly be stained a deep blue. In the same way, if there are germs of disease in our secretions, these will find their way to our hands, and will then be passed on to everything we touch. The end of each day finds human saliva freely distributed on doors, furniture, counters of shops, straps of tramcars, and everything that the hands of man touch. It is true that certain disease germs die soon after they leave the human body because they cannot survive at temperatures lower than blood heat; but this is of little avail if further supplies of the germ are constantly forthcoming.

Next in importance to human beings as carriers of bacteria come flies, whose bodies are structurally adapted for this purpose; their hairy limbs and bodies are crowded with bacteria which are easily brushed off on to anything they touch. Also their excretions and vomit are full of bacteria.

Susceptibility of Various Foods

The susceptibility of a foodstuff to spoilage by bacteria does not necessarily depend on the number of bacteria that are originally found upon it. Far more important is the texture and chemical composition of the foodstuff, especially the water content. For instance, cereal grains are very highly contaminated with bacteria on their surfaces, but they are almost immune to spoilage because of their low water content; this is borne out by the fact that a slight addition of water soon leads to spoilage (mustiness, moulds, or souring). On the other hand, meats and meat products, fruit and vegetables, unless dried, are very readily attacked by moulds, yeasts, and bacteria, and are therefore highly perishable. Many foods are dried so as to prevent spoilage and, as might be expected, the amount of water that can be safely left varies greatly in different cases; dried apples can be allowed to contain 25 per cent. of water, whereas dried milk should have less than 2 per cent. As regards other aspects of the chemical composition of foodstuffs, we may mention that fats are hardly at all attacked by micro-organisms, though they may suffer from chemical decomposition even at temperatures as low as 14° F.

Preventive Measures

Since bacteria are so universally distributed in nature, and so readily conveyed from place to place, how is food spoilage to be prevented? There are two obvious ways. First of all we can take precautions to keep food away from dust, dirt, flies, etc., and especially reduce the amount of human handling, and, secondly, we can put the food under such conditions that although bacteria may be present they will be prevented from doing any harm. Let us first consider how we can protect manufactured foods from becoming contaminated with bacteria. First and foremost we must minimise the amount of human handling, a point that cannot be over-emphasised. Factories and workers must be scrupulously clean, and precautions must be taken to insure the minimum amount of contamination from human sources. Animals and flies must be rigidly excluded, or the food will be freely infected with bacteria. Lastly, dirt and dust must be kept away. The washing of foodstuffs under strictly controlled conditions may reduce the numbers of bacteria present, but many routine washing processes increase rather than decrease the bacterial content of the food. Even if the food is washed under excellent conditions, the resulting material will rapidly spoil, because of the moisture deposited on the surface. In some special industries the problem of food handling has been intensely studied, but unfortunately in most cases old-fashioned and unsuitable methods are still in use. The present method of exhibiting perishable foodstuffs, such as potted meats, on retail counters is most undesirable. Display cases should be covered with glass to keep out flies, dust, etc., and here again human handling should be eliminated as much as possible.

Special Methods

We have seen that drying is one of the ways of treating foodstuffs to improve their keeping qualities. Smoking acts partly by drying and partly by the disinfectant action of tarry materials (and it has recently been shown that some formaldehyde is present in wood smoke). The addition of preservatives may keep down bacterial growth, but in some cases it merely serves to mask and not to prevent putrefactive processes. In the canning industry efforts are made to destroy any bacteria that may be present in the original material by careful processing. In other food industries, however, this is not possible, so that every precaution must be taken to prevent the further development of the bacteria present. One of the best methods of accomplishing this result is the proper use of low temperatures. Most bacteria are not killed by low temperatures, but their life-processes are slowed down to such an extent that they do very little harm, within reasonable periods of time. The great danger of the use of cold storage in this connection is that if the temperature fluctuates, films of moisture collect on the surface of the foodstuff; when the food is removed from the store, the moist surface is very likely to promote bacterial growth; surface slime may even form in the cold store, but this type of spoilage can often be prevented by the use of some kind of wrappers for the food. Already the use of cold storage has much reduced the incidence of food spoilage. Bone taint is a case in point. This type of spoilage is caused by the growth of anaerobic bacteria in meat. The organisms seem to be present originally in the carcasses, but their growth can be prevented by cooling the carcasses rapidly after the death of the animal.

(*Continued on page* 530.)

Overseas News

Small Sized Tins entering Canned Foods Market of India

LARGE TINS, principally No. 2½, seem to be by far the most popular in this market. There is some tendency, however, to try out the smaller sizes, and there is an increase in sale of No. 1 tins, while some firms have even gone so far as to put out 8 oz. tins. There is no doubt but that individuals and small families prefer the small sizes.

Persian Caviar Industry

In a report received from Vice-Consul David Williamson at Teheran, Persia, he states that as a result of the Caspian Sea Fisheries Convention between the Russian Soviet and Persian Governments, the joint company for the fisheries was formed on April 16, 1928. The Consul further states that the formation of this company had no apparent effect upon the price either of fish or of caviar. He calls attention, however, to the fact that during the quarter ending July 1 nearly 1,600 pounds of caviar, valued at about £220, were shipped directly from Persia to the United States. It is believed that this is the first direct shipment of sturgeon roe which has been made and that it may forecast a new era in the Persian caviar industry.

Analyses of Foodstuffs by Argentine Chemical Office

Of the rejected imports into Argentina, the largest items were 9,020 pounds of canned fish which was mostly salmon in unlacquered cans, together with a few sardines and 3,278 pounds consisting of two shipments of chewing gum, one of 2,275 pounds and one of 1,003 pounds. Another shipment consisted of gum drops, one of fruit essences, one of candy, one of alcoholic essences, one of artificial essences, and one of natural fruits.

Imports of Fish at Leghorn, Italy

Large amounts of salted and smoked herring are imported each year at Leghorn, which are supplied almost exclusively by Great Britain. Average imports of herring alone amount to approximately 2,200 short tons per year. About 90 per cent. of the herring consumption consists of salted herring as the higher prices for smoked herring will not permit large sales, herring being consumed essentially by the poorer classes.

Salted and dried cod fish, as well as salted and smoked herring, are imported in the largest quantities during the second half of the year, as such products are consumed mostly during winter months. Local importers have special refrigeration facilities for the preservation of the more perishable of such fish received during the warmer months.

Trawler System abandoned in Straits Settlements

The newspapers report that the trawler *Tongkol*, which has been in the Straits Settlements for some time experimenting with trawl-fishing operations in those waters, has now been sold. It proved impracticable to use a steam-trawler on those fishing grounds in view of the light catches obtained, although there is an excellent distribution of fish throughout the area. The *Tongkol* has been purchased by a trawling company in Ceylon, where satisfactory results have already been obtained by such methods and where a considerable expansion in the trawl-fishing industry is anticipated.

First Shipment from the New Fish Canning Plant at Ensenada, Mexico

The first shipment of fish, consisting of 1,500 cases of abalone, valued at £1,800, from the new fish-canning plant of La Nacional De Productos Marinos, left Ensenada recently *en route* to Honolulu, via Los Angeles, according to a recent report received from American Consul E. A. Wakefield at Ensenada.

Other shipments of the same product are to be forwarded in the near future, followed by shipments of tuna, mackerel, and other varieties which the company plans to can during the season.

Tuna is now being packed as rapidly as possible, the size of the daily pack depending upon supplies received. At present the average daily production approximates 200 to 225 cases of 48 one-pound tins.

It now appears that the cannery section of the new plant will prove decidedly more important commercially than the original fertiliser section. This will be definitely decided by the respective demands for the two products and relative net profits derived from the sale of each. After numerous delays by inability to secure sufficient supplies for canning, or for making fertiliser, the plant is apparently operating smoothly with a reasonably large seasonal production.

Austria Raises Permissible Sulphur Dioxide Content in Imported Raisins

For some months the Vienna office of the Department of Commerce has been negotiating with the Austrian Ministry for Social Welfare in an effort to effect a change in the Austrian food law by which the permissible amount of sulphur dioxide in dried raisins would be increased from 50 mg. to 1,250 mg. per kg. In 1926 that office succeeded in accomplishing a similar increase for dried fruits (Doerrobat), but the increase at that time did not affect raisins.

American Commercial Attaché Groves, at Vienna, reports that the efforts of that office in connection with raisins has now been successful, as indicated by a letter received from the competent Ministry.

The authorities in Prague have likewise provisionally authorised the sale of raisins with a maximum sulphur content of 1,250 mg., pending a definite action to that effect by the competent Ministry. This question has also been raised in Hungary, and it is hoped to have a favourable decision in due course.

German Asparagus Market continues Strong

The German market for asparagus is continuing very strong. In view of the failure of last year's crop, together with the fact that all of this year's white asparagus is reported to be sold, leaving available for that market only green asparagus, a further rise in prices for canned asparagus in Germany is expected.

South African Fresh, Smoked, Salted and Canned Fish Market

No statistics are compiled showing the quantities of preserved fish on hand in the Union of South Africa, according to a report of August 14 from C. M. P. Cross at Cape Town. Dealers report, however, that ample stocks are in the country to meet all probable demands until the shipments of the new season's pack arrive. The demand has undergone no notable changes during the past year. The statistics for the year 1927, which have been made public, show an increase in the imports of miscellaneous preserved fish of nearly 15 per cent. This increase has, apparently, been distributed over a wide variety of items, and includes Norwegian brisling and sardines from the Mediterranean as well as American and Canadian salmon. French sardines appear to have fallen off materially, but this decline was partly offset by the increase in the quantity from Italy.

Quotations for the new season's pack have already been received in Cape Town, and seem to indicate an increase in the prices of pink and chum salmon and a decrease in the price of red salmon over the previous year.

The general tone of the demand in South Africa for salmon is firm, and orders are being placed with less hesitation than was the case in 1927. This tone reflects in general the improved economic situation of the country, and the prospect for better purchases are brighter than they were in the previous year.

The fish preserving industry in South Africa is at present confined to crayfish, marketed as Cape lobster, the smoking of a species of Antarctic cod, known locally as stock fish, and the drying of baracuda, known locally as snoek.

The crayfish industry has experienced a marked revival during the past year as the result of the improved demand from France. Catches have been better and the canning factories have been operating steadily. The indications are that the pack for the 1928 season will be materially larger than for 1927. Practically all the crayfish tinned is exported. The local consumption is confined almost entirely to the fresh variety.

Canned Milk Imports into Singapore

In a letter to a firm in the trade, Don C. Bliss at Singapore has furnished some interesting information regarding the canned milk imports into that territory. In 1926 imports of condensed and evaporated milk amounted to 1,045,000 cases; sterilised milk amounted to 84,000 cases. In 1927, statistics differentiate between sweetened and unsweetened condensed milk. Imports of the sweetened product totalled 1,164,758 cases, of which Continental Europe supplied 768,679 cases, Australia 299,287, the United Kingdom 87,802, and the United States 881 cases. Of the total imports, 193,401 cases were re-exported. Imports of evaporated milk amounted to only 60,215 cases, of which 32,022 cases came from the United States, 14,217 from the United Kingdom, and 13,569 from Continental Europe. 8,186 cases were re-exported. Imports of sterilised milk amounted to 58,798 cases, of which this country supplied 16,331 cases, the remainder coming from Europe. Re-exports amounted to 16,441 cases.

In the first four months of this year imports of sweetened condensed milk amounted to 455,157 cases, of which U.S.A. supplied 4,939 cases, the remainder being divided in amounts proportionate to those given above. Evaporated milk imports totalled 26,270 cases, of which 15,424 came from the United States, and Europe and the United Kingdom supplied the balance. Of the imports of sterilised milk, which amounted to 17,802 cases, 6,731 came from the United States.

Anchovy Industry of Leghorn, Italy

American Vice-Consul David H. Huffum, under date of July 27, 1928, has furnished an interesting report on the anchovy industry at Leghorn. The industry has centred around Leghorn on account of its proximity to the Island of Gorgona, where the finest qualities of these fish are caught, and to its accessibility to the celebrated Lucca olive oil, which is available. In favourable seasons the annual catch runs from 8,000 to 10,000 drums of 70 kilos gross weight each. The fish are caught by trawl nets during the period of May to August. Salting in wooden drums is done on board the vessels by fishermen. When full, each drum weighs approximately 70 kilos, of which from 12 to 15 per cent. consists of salt. Storage in salt continues for about three months before the preparation for export. For local consumption, anchovies are packed in brine, but for foreign markets the demand is for fish in olive oil. In the preparation for the oil pack the fish in brine are washed, split, boned, and then packed in oil. The best grades are used for fillets, the poorer qualities being worked up into pastes and sauces. The exported product is generally packed in cans made locally from imported plate, and for the United States sizes range from 1 to 29 ounces, as ordered. About half of the oil pack goes to the United States and one-fourth to England. The remainder is shipped to Central Europe, Africa, Brazil, and Australia. Considerable quantities of the brine pack are shipped to England for the manufacture of anchovy sauce and paste. The following table gives the statistics of exports to the United States for 1927 and the first six months of 1928:

	Lbs.	*Approximate Value.*
Anchovies in Brine:		
During 1927	98,061	£5,400
During first 6 months of 1928 ...	19,617	900
Anchovies in Oil:		
During 1927	51,824	£6,600
During first 6 months of 1928 ...	52,170	6,800

During 1927 exports to the United Kingdom amounted to about 9,800 pounds, to Brazil 2,400 pounds, and about 7,400 to other points.

Pine-apple Canning Industry in Taiwan

W. F. Mason at Taihoku, Taiwan, has furnished a very interesting and valuable report on the development of the pine-apple canning industry in Taiwan.

The cultivation of pine-apples has been carried on for many years—originally to furnish fresh fruit, but recently for canning purposes in addition. In 1913 the acreage planted was slightly over 2,000, but in 1926, the last year for which figures are available, the area had grown to 5,511 acres. The canning industry has grown practically in direct proportion to the acreage. In 1912, six factories employing 97 workmen, produced 654,800 tins, while in 1926, thirty-five factories employing 859 workers produced 7,711,467 tins. It is obvious from these figures that the industry is carried on like that of the Straits Settlements, mainly by small canners. The pack is of two types, namely, "whole sliced" and "spiral sliced." The first is handled by a machine operation, but in the second type the outer skin is removed by hand before slicing. The whole sliced brands are usually higher priced on account of the greater losses of fruit in the preparation.

Until recent years little attention was paid to varieties, but since 1922 strong attempts have been made to encourage the growth of higher-grade fruit, using imported stock.

Under local conditions the Smooth Cayenne yields about ten tons per acre of an average weight of 74 ounces; the Mauritius varieties yield six tons, averaging 50 ounces per fruit; in addition, fruit imported from Sarawak and Singapore has been planted. The yields on these varieties are approximately 4½ tons per acre and the weights per fruit are 43 and 33 ounces respectively.

Nearly all of the canned product is exported to Japan, China, and Hong Kong, with occasional small shipments to the Netherland East Indies, Great Britain, and the United States. Total exports for 1927 amounted to about 438,000 cases, valued at around £300,000.

The industry at the present time is largely in the hands of small capitalists, and due to lack of sufficient funds, the development of quality has been rather slow. It is reported that several of the larger commercial firms in Japan are watching the development closely, and one has already acquired holdings of over 200 acres and is now actively engaged in cultivation. Further increases in production will, without doubt, be assisted considerably by Government aid. A Government pine-apple nursery is engaged in propagating superior varieties, and distributed approximately 50,000 slips in 1927, and it is expected that over three times that many will be distributed this year. It is reported, also, that small loans are being made to canning factories by the Government. Offices have been established in Kee Lung and Takao for the official inspection of canned pine-apples in order to maintain quality.

U.S. Imports of Whole and Skimmed Milk Powder

The following tables show the imports of whole skimmed milk powder into the United States during July and during the first seven months of 1928 compared with imports for the same periods of 1927. The tables have been compiled from figures released by the Statistical Division of the Department of Commerce:

WHOLE MILK POWDER.

Country of Origin.	July, 1928. Pounds.	July, 1928. Dollars.	July, 1927. Pounds.	July, 1927. Dollars.	First 7 months 1928. Pounds.	First 7 months 1928. Dollars.	First 7 months 1927. Pounds.	First 7 months 1927. Dollars.
Germany	—	—	270	117	—	—	424	364
Netherlands ..	165,406	25,268	439,809	77,068	1,279,113	210,071	588,021	102,91.
United Kingdom ..	1,013	640	1,476	807	113,947	10,781	3,584	1,870
New Zealand ..	360	241	—	—	1,242	892	756	45[illegible]
Australia	—	—	—	—	252	153	—	—
Canada	145,044	38,564	74,994	22,400	340,497	95,154	630,112	147,654
Other Countries ..	70	28	—	—	4,510	985	—	—
Total	312,753	64,742	516,549	100,491	1,739,561	318,857	1,222,897	253,256

SKIMMED MILK POWDER.

United Kingdom ..	—	—	—	—	115,012	9,734	—	—
Canada	45,047	2,478	279,078	19,126	490,236	43,710	908,701	66,90.
New Zealand ..	—	—	—	—	90	28	6,720	727
Australia	—	—	—	—	33	5	—	—
Netherlands ..	—	—	85,622	4,898			165,322	9,37[illegible]
Total	45,047	2,478	364,700	24,024	605,371	53,474	1,078,743	77,00[illegible]

U.S. Imports of Canned Tomatoes and Tomato Paste

The following tables show the imports of canned tomatoes and tomato paste into the United States during July and during the first seven months of 1928, compared with imports for the same periods of 1927. The tables have been compiled from figures released by the Statistical Division of the Department of Commerce:

CANNED TOMATOES.

Country of Origin.	July, 1928. Lbs.	July, 1928. Dollars.	July, 1927. Lbs.	July, 1927. Dollars.
Italy ...	2,708,179	169,946	2,002,295	118,392
Others ...	528	46	100	5
Total ...	2,708,707	169,992	2,002,395	118,397

Country of Origin.	First 7 mos. 1928. Lbs.	First 7 mos. 1928. Dollars.	First 7 mos. 1927. Lbs.	First 7 mos. 1927. Dollars.
Italy ...	38,607,266	2,226,319	30,394,171	1,749,318
Others ...	321,291	14,782	216,711	10,188
Total ...	38,928,557	2,241,101	30,610,882	1,759,506

TOMATO PASTE.

Country of Origin.	July, 1928. Lbs.	July, 1928. Dollars.	July, 1927. Lbs.	July, 1927. Dollars.
Italy ...	273,402	35,006	419,675	45,052
Others ...	179	19	10	1
Total ...	273,581	35,025	419,685	45,053

Country of Origin.	First 7 mos. 1928. Lbs.	First 7 mos. 1928. Dollars.	First 7 mos. 1927. Lbs.	First 7 mos. 1927. Dollars.
Italy ...	4,964,740	501,810	7,391 672	746,964
Others ...	486	63	9,737	1,015
Total ...	4,965,226	501,873	7,401,409	747,979

Norway's Canned and Powdered Milk Industry in 1927

A report on the concentrated milk industry of Norway has been recently issued.

Quantity statistics of the production of condensed

milk in 1927 are not yet available, but Government experts estimate that the 1927 figures will not differ materially from the production in 1926, when a total of 76,479,285 pounds, or 9 per cent. of the total quantity of milk delivered to the creameries, was used for condensing purposes, as compared with 10·2 per cent. in 1925. The production of powdered milk was resumed in Norway in 1926, after its production had been discontinued for some years.

Norway's fresh milk supply appears to be fairly constant. While the production for the first quarter of 1928 is somewhat in excess of that for the corresponding quarter in 1927, it is doubtful whether this level will be maintained during the remainder of the present season, due to the shortage of hay and forage crops last year and the below-average condition of pastures thus far this year.

Heretofore, the most profitable outlet for the farmer's fresh milk has been those creameries which dispose of the largest percentage of their output fresh to the consumer. The price paid by condenseries is, however, on the whole about the same as that paid for fresh milk for butter and cheese making.

Sanitary conditions in the dairy industry in Norway are good. For many years there has been very little tuberculosis in the dairy herds, and what remains is gradually being stamped out by systematic isolation and slaughtering of affected animals or herds. At present pasteurisation is optional, but the Government authorities are working toward a more thorough and complete control of the country's fresh milk supply, whereby all milk delivered to the creameries shall be pasteurised or otherwise sterilised. It is estimated that at present not more than 25 per cent. of the milk produced in that country is pasteurised.

Statistics of exports of condensed and evaporated milk for 1927 by countries just available are shown below. Exports of powdered milk for the same period totalled 49,650 pounds.

EXPORTS BY COUNTRIES OF EVAPORATED AND CONDENSED MILK IN 1927.

	Evaporated. (*Lbs.*)	*Condensed.* (*Lbs.*)
Sweden	50,712	—
Iceland	161,438	—
Svalbard (Spitsbergen)	54,028	—
Great Britain	34,280	—
France	104,423	—
Gibraltar and Malta	51,586	—
Egypt	49,588	—
Other countries of Northern Africa	24,794	—
West Africa	46,215	23,481
East Africa	111,901	—
British South Africa	612,797	1,287,744
Turkey in Asia	30,206	—
British East India	204,217	—
Dutch East India	216,227	—
Cuba	—	13,332,785
Argentina	—	30,470
Other countries in South America	—	38,720
Other countries	63,554	43,685
Total	1,905,966	14,756,885

Inasmuch as the supply of fresh milk is practically constant, it is believed that the amount of canned and powdered milk available for export during the current year will be at least equal to the average exports for the past five years of 14,856,638 pounds of condensed, 2,558,613 pounds of evaporated, and 52,445 pounds of powdered milk.

The bulk of the condensed milk produced in Norway is exported, while the evaporated milk manufactured there is used principally for domestic consumption. There is very little demand for powdered milk in Norway. It is used by bakeries, chocolate factories, and the like, but not in the homes.

New Zealand Export Trade in Canned and Powdered Milk

The following table gives a comparative statement of the export of canned and preserved milk from the Dominion of New Zealand as a whole for the year 1926 and 1927:

	1926 (*Lbs.*)	1927 (*Lbs.*)
Dried Milk, Full Cream Powder:		
United Kingdom	4,237,078	4,668,597
Hong-Kong	—	6,636
Australia	4,524	1,911
Fiji	1,350	8,918
Tonga	1,278	1,155
Western Samoa	2,922	5,045
Hawaii	2,040	1,940
Other	370	500
Total	4,249,562	4,694,702
Dried Milk n.e.i.:		
United Kingdom	5,470,224	5,257,440
Ceylon	7,845	16,800
India	2,240	448
Straits Settlements	51,561	91,992
South African Union	4,480	—
Canada	4,551	112
Australia	217,248	764,348
Dutch East Indies	400	7,120
France	44,800	22,400
Philippine Islands	1,087	1,952
Hawaii	31,876	6,720
United States	12,000	—
Other	1,080	1,256
Total	5,850,292	6,170,588
Milk and Cream, Preserved or Condensed:		
Straits Settlements	—	45,800
Australia	1,092,012	1,387,684
Fiji	64,625	38,798
Solomon Islands	1,245	1,764
Tonga	8,706	4,008
Western Samoa	22,906	23,925
Society Islands	34,934	53,186
Other	498	1,530
Total	1,224,926	1,556,695

Although there was but little variation between the exports for the years 1926 and 1927, 1928 has started off with what bids fair to be a record production of dried milk, as well as showing a healthy increase in the export of canned milk. No special condition seems to influence this increased output, it being evident that it is merely the result of a greater effort to find a market for the output of the present dried milk factories.

The slow growth of the New Zealand export of canned and powdered milk is clearly due to the ease with which the local production of butter and cheese

may be marketed in Great Britain, the ease in selling the output of the country on one big market, and in its simpler forms of manufacture being such as to discourage the costlier and more complicated processes of milk preserving, and the more intricate marketing machinery for selling the product in many different countries.

Australian Exports of Canned Fruits

The following statistics show the exports of canned fruits from Australia from the beginning of the past season up to the end of May, 1928:

AUSTRALIAN EXPORTS—CANNED FRUITS—CASES 24 NO. 2½ CANS.

Destination.	*Apricots.*	*Peaches.*	*Pears.*	*Total.*
United Kingdom ...	20,051	142,430	53,418	275,799
New Zealand ...	3,861	6,952	2,117	12,930
Canada	525	1,800	350	2,675
The East	532	672	740	1,944
Miscellaneous ...	410	848	677	1,915

The report referred to quotes the *Australasian Fruit World* and says that of the 25,092 tons of Australian dried fruit shipped to Great Britain during 1927 most of it has been sold at an average of £58 per ton. The carry-over of Australian sultanas in early July was reported at 8,000 tons, and it is believed that this will assist in making available a steady supply of Australian sultanas on the British market. The quality of the 1928 crop is said to be lower than that of 1927.

Exports of Preserved Fruit from Union of South Africa during April

The following statement shows the exports of fruits, preserved, bottled, and tinned from the Union of South Africa during April of 1928 and 1927:

	April, 1928. (*Lbs.*)	*April, 1927.* (*Lbs.*)
Canned Pines:		
United Kingdom	238,181	91,205
Canada	44,500	189,200
New Zealand	1,125	2,025
Kenya Colony	1,350	348
Belgian Congo	3,305	1,820
Norway	900	—
India	—	1,350
Belgium	—	4,500
Holland	—	2,250
Total	289,361	292,788
Other Bottled and Tinned:		
United Kingdom	843,750	5,364
Canada	2,700	—
Kenya Colony	406	—
Portuguese East Africa ...	1,552	58
Portuguese West Africa ...	60	1,085
Belgian Congo	—	3,735
New Zealand		41,625
Australia		180
India		9,450
Total	848,558	61,497

(*Continued from following page.*)

OLD BROMPTON CONFECTIONERY CO., LIMITED. (233826) Regd. Oct. 5, 1928. Coldharbour Place, Bexley Road, Erith. To take over the bus. of a wholesale dlr. and mnfr. of sweets cd. on at 24, High Street, Gillingham, and Coldharbour Road, Erith, by A. F. Jarvis. Nom. Cap.: £200 in £1 shares.

R. YOUNG AND COMPANY, LIMITED. (233951) Regd. Oct. 10, 1928. 3, Aldersgate Buildings, E.C.1. To carry on bus. as genl. mchts., land agents, wholesale and retail confectioners, restaurateurs, grocers, etc. Nom. Cap.: £1,000 in 1/- shares.

WE-TEN, LIMITED. (233862) Regd. Oct. 6, 1928. Borough Bakery, Elizabeth Street, Salford, Lancs. To carry on the bus. of mnfrs. of and dlrs. in a particular kind of flour suitable for the baking of wheaten farls to be known as "We-T*ens*." Nom. Cap.: £500 in £1 shares.

London Gazette Information

Joint Stock Companies.

The name of the undermentioned company was struck off the Register on September 28, 1928, and is dissolved:

PERFECT FOOD CO., LTD.

Meetings to Hear Voluntary Liquidator's Report.

(Note.—Voluntary liquidations may, in some instances, refer to companies in course of reconstruction.)

THE HUNSINGORE AND DISTRICT FRUIT GROWERS' ASSOCIATION (in voluntary liquidation). A General Meeting of this company will be held at the office, Walsford, near Wetherby, on November 12, at seven o'clock, to receive the account of the liquidator showing how the winding-up of the company has been conducted. Liquidator: J. E. Somerton.

JOSEPH DALZELL'S PARTON AND HARRINGTON BREWERIES, LTD. (in voluntary liquidation). A General Meeting of the Members of this company will be held at 37, English Street, Carlisle, on November 30, at 2 p.m., to receive the account of the liquidator showing how the winding-up has been conducted. Liquidator, T. P. Parmeter.

JOHN THOMPSON AND SON (OPMUS FLOUR), LTD (in voluntary liquidation). A General Meeting of the Members of this company will be held at the office of Messrs. Hodgson, Harris, and Co., C.A., National Provincial Bank Chambers, Market Place, Boston, on November 23, at twelve o'clock, for the purpose of receiving the liquidator's account showing how the winding-up has been conducted. Liquidator, R. F. Helm.

Commercial and Legal News

New Companies

W. F. SWALLOW AND SON, LIMITED. (233538) Regd. Sept. 22, 1928. To take over the bus. of a miller and corn mcht. cd. on at Wharf Rd., and The Mill, Bridge End Road, Grantham, as W. F. Swallow and Son. Nom. Cap.: £12,500 in £1 shares.

FLEETWOOD DAIRY, LIMITED. (233488) Regd. Sept. 21, 1928. 5, North Street, Fleetwood. To take over the bus. of a dairyman, dairy produce dlr., salt mcht. and drysalter cd. on at Fleetwood as the "North Street Dairy." Nom. Cap.: £1,200 in £1 shares.

FRUIT PRODUCTS, LIMITED. (233490) Regt. Sept. 21, 1928. To carry on the bus. of buyers, sellers, and preservers of all kinds of fresh and dried fruits, etc. Nom. Cap.: £10,000 in £1 shares.

GRAHAMS (LIVERPOOL), LIMITED. (233528) Regd. Sept. 22, 1928. 3, Stanley Street, Liverpool. To carry on the bus. of dlrs. in sugar and all other kinds of groceries, provisions, and produce, etc. Nom. Cap.: £20,000 in £1 shares.

EIVERS, LOW, AND COMPANY, LIMITED. (233575) Regd. Sept. 25, 1928. 17, Stanley Street, Liverpool. To import, export, and generally deal with fresh and dried fruits, vegetables, butter, wines, spirits, etc. Nom. Cap.: £1,000 in 990 preferred ord. shares of £1 each and 100 deferred shares of 2/- each.

CASANOVA, LIMITED. (233648) Regd. Sept. 28, 1928. Walmer House, 288, Regent Street, W. 1. To carry on the bus. of refreshment room proprs., etc. Nom. Cap.: £7,500 in £1 shares.

THOMAS BORTHWICK AND SONS, LIMITED. (233714) Regd. Oct. 1, 1928. To take over the bus. of Thomas Borthwick and Sons, Ltd. (incorpd. in 1905), and to carry on the bus. of importers and exporters of and dlrs. in meat, produce, and provisions; fellmongers, tallow melters, etc. Nom. Cap.: £1,750,000 in £1 shares.

KNIGHT'S STORES (BROMLEY), LIMITED. (233690) Regd. Sept. 29, 1928. To take over the bus. of corn and genl. mchts., grocers, etc., cd. on at 454, Bromley Road, Catford, and at 17, Mason's Hill, Bromley, Kent, as "Knight's Stores (formerly H. Knight and Son)." Nom. Cap.: £3,000 in £1 shares.

PILBEAM AND FROWD, LIMITED. (233697) Regd. Sept. 29, 1928. To carry on the bus. of importers and exporters of and dlrs. in milk, cream, butter, and other dairy produce, etc. Nom. Cap.: £10,000 in £1 shares.

HILL FARM DAIRY COMPANY, LIMITED. (233686) Regd. Sept. 29, 1928. Hill Farm Dairy, 1, Orchard Gardens, High Road, Goodmayes. To take over the bus. of a dairyman cd. on at Goodmayes by F. Norman. Nom. Cap.: £800 in £1 shares.

HOUGH'S DAIRIES, LIMITED. (233724) Regd. Oct. 1, 1928. 16-22, Elias Street, Liverpool. To take over the bus. of a dairyman and farm produce mcht. cd. on at Liverpool by E. Hough. Nom. Cap.: £7,000 in £1 shares.

LITT, OLDHAM, AND COMPANY, LIMITED. (233747) Regd. Oct. 2, 1928. Metropolitan House, Charterhouse Street, E.C. 1. To take over the bus. of a meat commission agent and wholesale meat salesman cd. on at 77a, Charterhouse St., E.C., by E. C. W. Oldham. Nom. Cap.: £7,000 in £1 shares.

ELLAND FLOUR MILLS (ELLAND), LIMITED. (233682) Regd. Sept. 29, 1928. The Mill, Elland, Yorks. To acquire the goodwill and bus. now cd. on by Elland Flour Mills, Ltd. Nom. Cap.: £1,000 in £1 shares.

CLEVELAND FLOUR MILLS (THORNABY), LIMITED. (233679) Regd. Sept. 29, 1928. The Mill, Thornaby-on-Tees, Yorks. To acquire the goodwill and bus. now cd. on by The Cleveland Flour Mills, Ltd. Nom. Cap.: £1,000 in £1 shares.

A. AND R. APPLETON (HULL), LIMITED. (233674) Regd. Sept. 29, 1928. The Mill, Hull, Yorks. To acquire the goodwill and bus. now cd. on by A. and R. Appleton, Ltd., and to carry on the bus. of flour millers and dlrs., etc. Nom. Cap.: £1,000 in £1 shares.

WILLIAM METCALFE AND SONS (MALTON), LIMITED. (233701) Regd. Sept. 29, 1928. To acquire the goodwill and bus. now cd. on by William Metcalfe and Sons, Ltd., and to carry on the bus. of flour millers and dlrs., etc. Nom. Cap.: £1,000 in £1 shares.

J. S. MYCOCK AND COMPANY, LIMITED. (233767) Regd. Oct. 3, 1928. 27, Clarence Street, Liverpool. To take over the bus. of wholesale butchers cd. on at The Abattoir, Trowbridge Street, Liverpool, and at Rupert Farm, Rupert Lane, Huyton, as "J. S. Mycock and Co." Nom. Cap.: £14,000 in £1 shares.

A. BENTLEY, LIMITED. (233779) Regd. Oct. 4, 1928. 4, Cecil Road, Hale, Ches. To take over the bus. cd. on at Hale, Ches., by Enderbys (Manchester), Ltd., and to carry on the bus. of bakers and confectioners, etc. Nom. Cap.: £500 in £1 shares.

I. RABINOWITZ AND COMPANY, LIMITED. (233792) Regd. Oct. 4, 1928. 27, Clarence Street, Liverpool. To take over the businesses of wholesale butchers cd. on at the Abattoir, Trowbridge Street, Liverpool, as "I. Rabinowitz and R. S. Dodson and Co., Ltd." Nom. Cap.: £35,000 in £1 shares.

WALDENS MID-WILTS CREAMERIES, LIMITED. (233851) Regd. Oct. 6, 1928. To take over the bus. of butter mnfrs. and dairymen cd. on at Hilperton, Trowbridge, Wilts., by Henry J. Walden and Herbert J. Walden. Nom. Cap.: £6,000 in £1 shares (2,500 pref. and 3,500 ord.).

(*Continued on previous page.*)

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Fruit and Vegetable Products

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178. Use of Ethylene for Softening Bartlett Pears Intended for Canning or Drying. E. M. Chace and D. G. Sorber. (*Canner*, 1928, 67, [xiii.], 15-16.)

179. Factors in the Preservation of Cider. S. H. Ayres, H. A. Barnby, and E. L. Voight. (*Glass Container*, 1928, Sept., 7-8.)

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183. Vitamin Content of Canned Spinach. E. Pierson. (*S. Dakota Agric. Exp. Sta. Ann. Rep.*, 1926, 23.)

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186. Effect of Alkali Solutions on Bacteria found in Unwashed Milk Bottles. C. S. Mudge and B. M. Lawler. (*Ind. Eng. Chem.*, 1928, 20, 378-380.)

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188. Determination of Milk Solids in Mixed Feeds. A. B. Davis. (*J. Assoc. Off. Agric. Chem.*, 1928, 11, 410-417.)

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190. Effect of Various Rations on Storage Quality of Eggs. R. M. Sherwood. (*Texas Agric. Exp. Sta. Bull.*, 1928, No. 376, 12 pp.)

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192. The Copper Content of Milk. G. N. Quam and A. Hellwig. (*J. Biol. Chem.*, 1928, 78, 681-684.)

Various

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194. Viscosity and the Ice-Cream Mix. G. D. Turnbow and K. W. Nielson. (*Ind Eng. Chem.*, 1928, 20, 376-378.)

195. Coffee Parchment as Adulterant of Bran and Sharps. J. Evans and T. E. Wallis. (*Analyst*, 1928, 53, 432-434.)

196. Antirachitic Properties of Cod-Liver Meals. R. M. Bethke, G. Zinzalian, D. C. Kennard, and H. L. Sassaman. (*J. Agric. Res.*, 1928, 36, 747-753.)

197. Mayonnaise, an Emulsion. A. W. Bitting. (*Canner*, 1928, Sept. 29, 32-34.)

198. Moisture Content of Oleomargarine. R. H. Kerr. (*J. Assoc. Off. Agric. Chem.*, 1928, 11, 382-386.)

199. Application to Meat and Meat Food Products of a Rapid-boiling Short-digestion Method for Determination of Protein. H. R. McMillin. (*J. Assoc. Off. Agric. Chem.*, 1928, 11, 408-410.)

200. Composition and Nutritive Value of Philippine Food Fishes. A. Valenzuela. (*Philippine J. Sci.*, 1928, 36, 235-242.)

Analysis

201. Chemical Examination of Army Biscuit. J. Straub and J. P. Peper. (*Pharm. Weekblad*, 1928, 65, 765-776.)

202. Determination of Iodine in Mineral Mixtures [for feeding stuffs]. M. D. Knapheide and A. R. Lamb. (*J. Amer. Chem. Soc.*, 1928, 50, 2121-2125.)

203. Detection and Determination of Starch in Margarine. A. Schmidt. (*Milch. Zentr.*, 1928, 57, 213-214.)

204. Identification of Prohibited Coal-Tar Colours in Foodstuffs. A. R. Jamieson and C. M. Keyworth. (*Analyst*, 1928, 53, 418-423.)

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Recent Patents

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Latest Patent Applications

28121. SWIFT AND CO.: Meat products, etc. October 1.

28138. SALERNI, P. M.: Manufacture of confections. October 1.

28529. WRIGHT, F. R.: Apparatus for production of fried potatoes, etc. October 4.

28553. LAFEUILLE, F.: Treatment of syrup. October 4.

28613. STETSON, L. W.: Confections. October 5.

28746. SIEDEL, J.: Production of butter. October 6.

Specifications Published

297,074. I. G. FARBENINDUSTRIE AKT.-GES.: Conserving foods, provisions, technical and pharmaceutical preparations, and like substances, and the manufacture of disinfecting preparations.

297,256. NYROP, J. E.: Cream or like fatty powders, and process for the manufacture of same.

297,338. MAUTNER, H.: Process for increasing the stability of solid sugar, more particularly starch sugar.

297,596. KJAERGAARD, C. N.: Process for the manufacture of feeding-cakes.

297,927. GERNHARDT, B.: Rapid process for the automatic production of inspissated sugar-fruits.

297,951. DUNLOP, W. R.: Egg-cleaning apparatus.

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at the uniform price of 1s. each.

Abstracts Published

294,520. **Extracting sugar.** FARNELL, R. G. W., 14, Cardinal Mansions, Carlisle Place, London.

Beet in the form of cossets or other divided state is dried before extraction at 100° C. or below, and at atmospheric pressure, the pressure, while the material is in a heated condition, being suddenly reduced to facilitate the subsequent diffusion process.

294,790. **Chocolate.** NYROP, A., 11, Lyngbyvej, Copenhagen.

In making chocolate, in place of the usual intensive grinding of the initial materials they are brought into liquid form and then atomised in a heated atmosphere of air or other gas. Melted cocoa-butter and/or cocoa mass or other fat and a solution or liquid mass of sugar and cocoa in milk are simultaneously atomised in warm gas by the same or separate atomisers. The chocolate particles are thus coated with the cocoa-butter, cocoa mass, or fat, and the powder may be pressed into moulds or formed into block chocolate. Some of the liquid mass may be added to the fat or some of the fat may be added to the liquid mass prior to the atomisation. For bringing the initial materials to liquid form, ground cocoa beans may be swelled in a solution of sugar in milk, or unground roasted and peeled beans may be swelled by heating in water or milk and then comminuted in the swelled state. To increase the flavour the beans in aqueous suspension may be fermented or alkali may be added before the drying operation.

294,903. **Preserving milk, etc.** SEIDEL, F., Vienna, AND GIANI, A., Trieste.—(Assignees of Parcus, G.)

Milk and other nutrient liquids are sterilised and preserved by treatment at a raised non-injurious temperature and under vacuum with electricity, the liquid being then hermetically sealed in flasks or cans. The raw milk is heated to below 66° C. and the air exhausted therefrom, and is then fed through a pipe and sieve to an air-tight casing, which is maintained at about one-seventh atmosphere pressure by connection through another pipe to vacuum. The milk flows in a layer 1 cm. deep down an insulated rustless steel plate, where it is electrically treated, the sterilised milk leaving through a pipe. Current is supplied to plate by cylindrical iron electrodes, each having a winding, the windings being connected in series to a current source. The current flows from plate through the milk and the rarified air above to an insulated metal plate having a plurality of downwardly directed metal points. The sterilised milk is cooled to 1° C. and then hermetically sealed in containers, which may first be sterilised. The vitamin content of the milk is said to be increased by the treatment.

295,002. **Cooling confectionery.** BERTEN AND CO. GES., Viersen, Rhineland, Germany.

Sweetmeats are delivered on to a rotatable table for cooling. Preferably the table is provided with removable sector-shaped sieved trays filled in succession from a shoot, and a current of air is directed on to them through a nozzle.

295,053. **Making meat tender.** CUMIN, A., 41, Rue Emile Raspail, Arcueil-Cachan, Seine, AND BAILLEUIL, J., 126, Rue Castagnary, Paris, both in France.

295,466. **Capping bottles, jars, and the like.** HERBERT, S. G., Bermuda, Percy Road, Bexley Heath, Kent.

295,619. **Treating sugar beet.** OWEN B. J., AND STEAD, C., Institute of Agricultural Engineering, University of Oxford, Oxford.

Fresh whole sugar beets in mass or in piled layers are slowly dried in a continuous current of warm air at 80° to 90° F., induced by natural means, without

hardening their surfaces, and are subsequently dry-cleaned and shredded for extracting the sugar therefrom. The rate of drying may be accelerated in the early stages, and the temperature increased during the later stages. The operation may be carried on in the absence of light, and carbon dioxide or sulphur dioxide may be mixed with the air supply. Small air fans may be provided to increase the exit velocity of the drying medium. In one arrangement the beets are piled in layers on grids about a conical structure, having a light-excluding casing, dampers being provided. In another arrangement, the beets are treated in layers on a grid sunk in a pit.

295,623. **Decolorising-agents.** BUTTNER-WERKE AKT.-GES., AND KLEINMANN, F., 38, Friedrichstrasse, both in Uerdingen-on-Rhine, Germany.

Purifying saccharine liquids.—Decolorising-agents for the treatment of sugar are prepared by intimately mixing hydrated aluminium silicates—*e.g.*, fuller's earth—with soot, such as is obtained from American natural gas, in the presence of wetting agents such as alcohol, acetone, etc., the mixing being effected by wet grinding as in a ball mill which is preferably heated. Binding agents having decolorising properties, such as silicagel or freshly precipitated hydrate of alumina, may be added. The wetting liquid is separated by suction, and the decolorising agent gently dried by heat before use.

295,648. **Ferments.** LINDNER, P., 9, Sybelstrasse, Charlottenburg, Berlin.

Cane sugar, glucose, and fructose are fermented for the production of carbonic acid, alcohol and lactic acid by means of a single kind of bacterium such as termobacterium mobile occurring in the aguamiel of the Agave americana. The ferment may be prepared by introducing the bacterium in sterilised milk with the addition of cane sugar, glucose, or fructose. Fruit juices and plant extracts which contain any of the said sugars may be converted into a sparkling alcoholic and slightly lactic beverage. Brewers' wort, solution of malt extract and sugared milk may be fermented, but only the glucose and the added sugar are fermented. The bacteria may be used in bread making. Calcium carbonate may be added in any of the fermenting processes if the slight souring of the lactic acid is not desired.

295,884. **Margarine, etc.** REDDIE, L. N., 6, Bream's Buildings, London. (Akt.-Ges. für Medizinische Produkte Chemische Fabrik; 14, Tegelerstrasse, Berlin.)

In the manufacture of margarine and other similar edible fats, lecithin and cholesterol and/or phytosterol and fat mixtures are obtained by alcohol extraction from animal and/or vegetable oils or fats, and these mixtures are added to the basic fat mass. Egg yolk oil may be treated with hot denatured spirit so that lecithin, cholesterol, and a little fatty oil are dissolved out; after the mass has stood for some time the solution is drawn off and the spirit distilled over, and the residue thus obtained is rich in lecithin and cholesterol. 200-250 grs. of this mixture, either alone or emulsified with water, are added to 500 kilogrs. of margarine in the churn. Soya bean oil may be similarly treated, and the extract added to margarine.

296,012. **Preserving eggs.** PENFOLD, A. H., 9, Kilmorie Road, Forest Hill, London.

Liquid egg material in the form of yolks or mixed yolks and whites is preserved by adding dextrose—*e.g.*, 10 to 20 per cent. by weight, and storing at a temperature below freezing point—*e.g.*, about 15° F. Specification 11449/10 is referred to.

Recent Trade Marks

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DEWYSWEET

491,445. **Butter, condensed milk, and cheese.** BURGESS' DAIRY, LIMITED, 32, 44, 46, 48, and 52, Gartside Street, Manchester. October 10.

HARMONY

493,296. **Biscuits covered with chocolate.** GRAY, DUNN AND COMPANY, LIMITED, 75, Stanley Street, Kinning Park, Glasgow. October 10.

DARJINDO

493,900. **Tea.** WAITROSE, LIMITED, 21 and 23, Gloucester Road, South Kensington, London, S.W. 7. October 3.

VIOLA

494,010. **Dried fruits.** JOSEPH SHAPTON AND SONS, LIMITED, Canada House, Baldwin Street, Bristol. October 3.

(Continued from page 521.)

Conclusion

To summarise, we may state that all foodstuffs are to some extent originally contaminated with bacteria. Flesh foods may be practically free from bacteria when the animal is killed, but soon after death bacteria penetrate into the tissues from the alimentary canal. The surface of fresh vegetables is very heavily contaminated with micro-organisms, which abound in the soil. This original contamination is not usually serious if the foods are eaten within a short time, but the harm is immensely increased when foods are subjected to prolonged periods of transport and storage. In this way the original bacteria increase in numbers, and worse, still more bacteria are introduced as the result of human handling, contact with insects, dust, etc. Food spoilage is the inevitable result, and cannot be prevented unless proper precautions are taken at every stage of the proceedings.